DOCUMENT RESUME

ED 320 859 SP 032 103

TITLE	Nutrition Education. Program Evaluation Handbook.
INSTITUTION	IOX Assessment Associates, Culver City, CA.
SPONS AGENCY	Centers for Disease Control (DHHS/PHS), Atlanta, GA.; Public Health Service (DHHS), Rockville, MD. Office of Disease Prevention and Health Promotion.
PUB DATE	88
NOTE	206p.; For the other titles in this series, see SP 032 099, SP 032 101-105, and SP 032 107.
AVAILABLE FROM	IOX Assessment Associates, 5420 McConnell Ave., Los Angeles, CA 90066 ($17.95).
PUB TYPE	Guides - Non-Classroom Use (055)
EDRS PRICE	MF01/PC09 Plus Postage.
DESCRIPTORS	Affective Measures; Attitude Measures; *Eating Habits; *Evaluation Criteria; Evaluation Methods; Health Education; *Nutrition Instruction; *Program Evaluation; *Psychometrics; Questionnaires

ABSTRACT

Intended as a resource for individuals wishing to evaluate nutrition education programs, this handbook, one of a series of seven, provides a collection of measuring devices that can improve the quality of such evaluations. Chapter 1 introduces the handbook's contents and outlines evaluation related issues specific to nutrition education programs. Chapter 2 introduces the key operations involved in program evaluation, emphasizing the role of assessment instruments in the gathering of information needed for defensible evaluations. Chapter 3 contains the measuring tools designed to be used in the evaluation and design of nutrition education programs. These measures deal with behavior, knowledge, skills, and affective outcomes. Each measure is introduced by a brief description of the purpose of the assessment instrument, as well as procedures for administering, scoring, and analyzing the resulting data. Chapter 4 describes how technical appraisals of the handbook's measures can be carried out. The three appendices contain amplified content descriptors for updating the various measures, an explanation of informed consent procedures, and an annotated bibliography. (JD)

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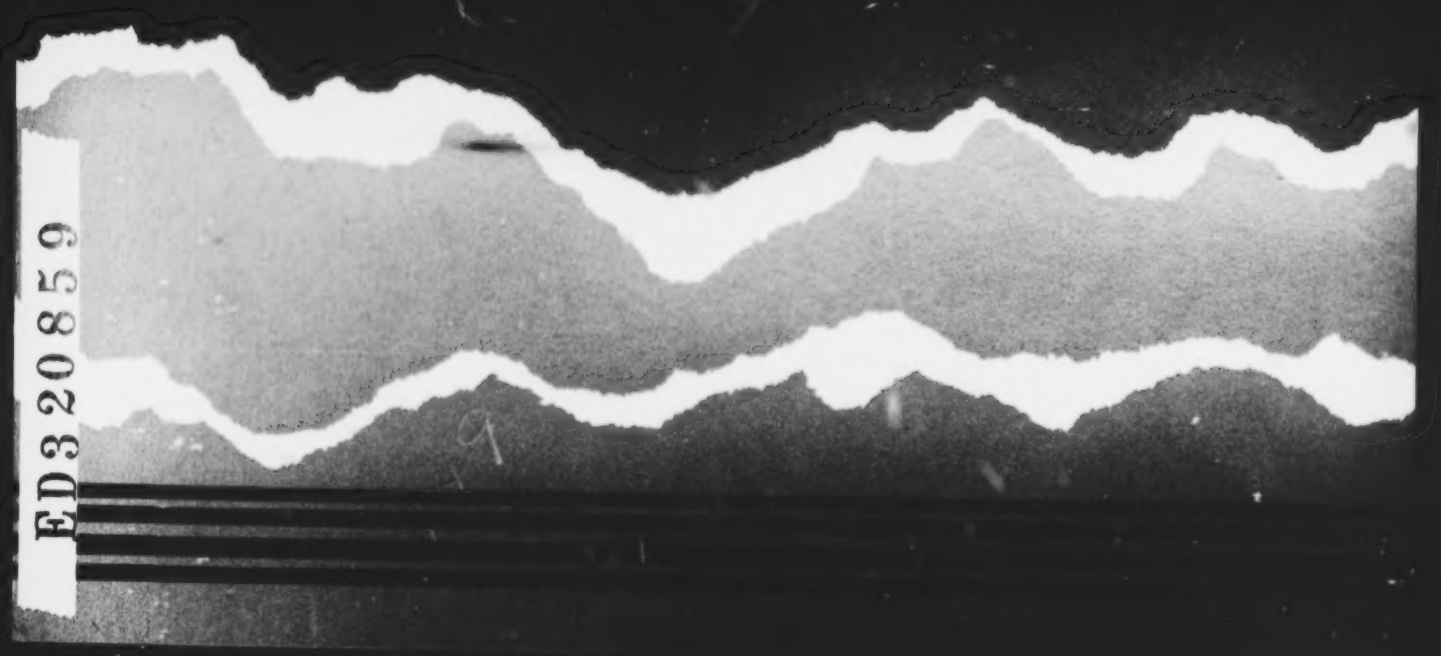

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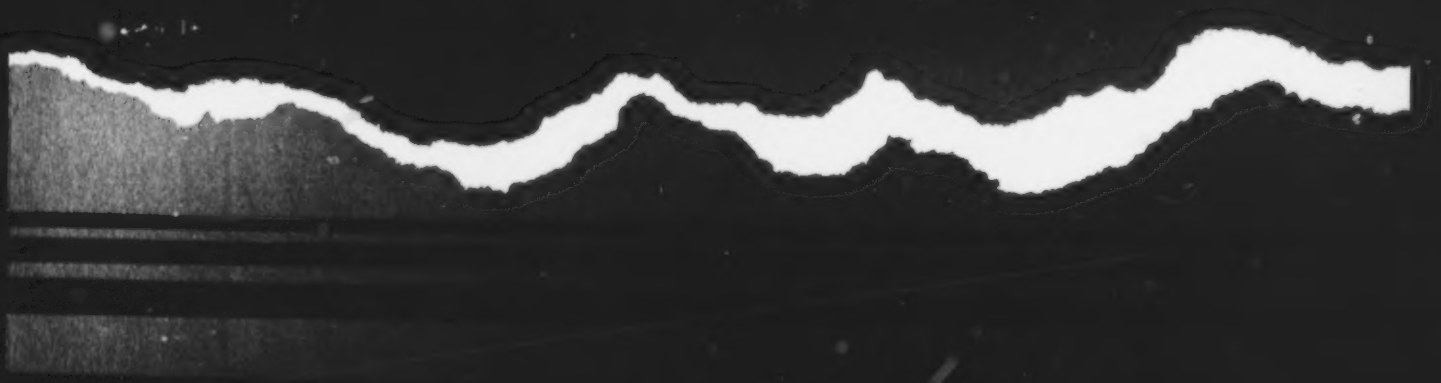

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SP032 103

PROGRAM EVALUATION HANDBOOK

NUTRITION EDUCATION

Prepared for

The Center for Health Promotion and Education
United States Centers for Disease Control

The Office of Disease Prevention and Health Promotion
Office of the Assistant Secretary for Health
United States Department of Health and Human Services

by

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1988

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Preface

In recent years, health educators have increasingly recognized that systematic evaluation can help them appraise and improve their programs. For this potential to be realized, however, effective mechanisms for gathering relevant data are required. In the past, critical information about a program's effects was not collected in some instances because suitable measures for gauging those effects were lacking. The purpose of this handbook is to rectify, at least in part, this deficiency in the evaluation of health education programs dealing with nutrition.

This book is one of seven health education evaluation handbooks resulting from a project jointly initiated in 1980 by the United States Centers for Disease Control (CDC) and the Office of Disease Prevention and Health Promotion (ODPHP) of the Office of the Assistant Secretary for Health. The handbook is not intended to be prescriptive or all-inclusive. Those who evaluate nutrition programs should regard the handbook as only a resource, that is, a collection of assessment tools that may be of use in program evaluation. The extent to which the handbook will actually be useful depends chiefly on the extent to which it contains assessment tools that correspond to the evaluation needs of a particular nutrition program.

Handbook Development

This handbook has been created by IOX Assessment Associates (IOX), selected competitively on the basis of responses to a governmentally issued request for proposals. IOX was to collect and develop program evaluation measures for critical behavioral, knowledge, skill, and affective outcomes in the area of nutrition. Three panels of experts played prominent roles in the creation of this handbook. A **Handbook-Development Panel**, consisting of six experts familiar with nutrition programs or their evaluation, guided the initial development of the handbook. The Handbook-Development Panel identified important outcomes for nutrition programs. IOX staff, drawing on the advice of panelists, then developed assessment instruments to assess panel-identified program outcomes. The names and affiliations of the Nutrition Handbook-Development Panelists are provided on the following page.

Handbook-Development Panel

Dr. Peter Cortese
California State University
Long Beach
Long Beach, California

Dr. Howard Jacobson
The Institute of Nutrition
University of North Carolina
Chapel Hill, North Carolina

Dr. Marianne King
National Dairy Council
Rosemont, Illinois

Dr. Lois Maiman
University of Rochester
Rochester, New York

Dr. Jason Millman
Cornell University
Ithaca, New York

Dr. Marty Slattery
St. Paul-Ramsey County
Health Department
St. Paul, Minnesota

The Handbook-Development Panel met at the beginning of the project in order to isolate the chief outcomes that nutrition programs could reasonably be expected to promote. Preliminary statements reflecting these outcomes were identified by the panelists. These preliminary outcome statements were refined by IOX staff, and mailed to the panelists and other interested specialists, all of whom rated the importance of each statement. The list of high-priority outcomes that resulted was used to guide the selection and development of the original handbook's measures.

All newly developed measures were mailed to the panelists for review. In addition, all of these measures were tried out with small groups of respondents. The measures were revised based on the informal tryouts and the panelists' review comments. All of the new measures were also reviewed by IOX staff in an effort to eliminate any potential ethnic, gender, religious, or socioeconomic bias.

A completed version of the nutrition handbook was delivered to the government in 1983. Several thousand copies of the handbook were released by CDC and ODPHP to health educators throughout the nation.

Handbook Revision

Subsequent to the initial distribution of the handbook, CDC issued, in concert with ODPHP, a second request for proposals which led to the comprehensive revision of the existing nutrition handbook. To guide the review and revision of the nutrition handbook, a **Handbook-Revision Panel** was constituted. Members of the panel were selected because of their dual expertise in (a) the field of nutrition and (b) measurement of the outcomes sought by nutrition programs. Members of the Handbook-Revision Panel and their affiliations are listed on the following page.

Handbook-Revision Panel

Dr. Johanna Dwyer
Frances Stern Nutrition Center
New England Medical Center Hospital
Boston, Massachusetts

Dr. Joan Gussow
Columbia University
New York, New York

Dr. Luise Light
National Cancer Institute
Bethesda, Maryland

Dr. Barbara Shannon
Pennsylvania State University
University Park, Pennsylvania

Ms. Janet Tenney
Giant Food Inc.
Washington, District of Columbia

The Handbook-Revision Panel met on two occasions. In these meetings, panelists reviewed the contents of the initial version of the nutrition handbook, particularly its measures, then suggested deletions, modifications, or additions. Panelists also provided guidance regarding ways of making the handbook more usable to practitioners. During both of these meetings, the panelists were attentive to the accuracy of the handbook's contents. Considerable content, in the measures as well as the introductory materials, was revised or deleted on the basis of panelists' suggestions.

Overall Guidance

A third panel, the **Project Advisory Panel**, provided overall guidance to IOX staff during the final three years of the project. These individuals offered technical counsel and strategic advice during the revision of all handbooks. Members and affiliations of the Project Advisory Panel are listed below.

Project Advisory Panel

Dr. Peter A. Cortese
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Dr. Jonathan E. Fielding
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Dr. Lawrence W. Green
Henry J. Kaiser Family Foundation
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Dr. William L. Haskell
Stanford University
Stanford, California

Acknowledgments

The project that led to the creation of this handbook was funded by the CDC and ODPHP. Dr. Walter J. Gunn of CDC conceptualized the project and supplied technical guidance throughout its first phase. During this time, Dr. Diane Orenstein of CDC as well as Dr. Donald Iverson and Dr. Patricia Mullen, both of ODPHP, served as project officers.

During the project's second phase, that is, the revision of the handbook, Dr. Orenstein of CDC continued to serve as project officer, along with Dr. Joel Kavet, Dr. Gregory Christenson, and Mr. James Harrell of ODPHP.

As the handbook progressed, numerous health educators throughout the nation offered their insights regarding the handbook's contents. Without their expert assistance, development of this volume would have been impossible.

IOX Assessment Associates
July, 1988

CHAPTER ONE

A Resource for the Evaluation of Nutrition Education Programs

A Resource for the Evaluation of Nutrition Programs

This handbook is intended to help those individuals who wish to evaluate health education programs dealing with nutrition. More specifically, the handbook provides a series of measuring devices that, if selected and used judiciously, can improve the quality of such evaluations. As a consequence, not only will the technical quality of the program evaluation be improved, but any program-related decisions based on the evaluation's results are apt to be more defensible.

An Evidence-Oriented Era

In recent years, educators have experienced substantially increased pressures to produce evidence that their programs are functioning effectively. In contrast to an earlier era when it was widely thought that most educational programs were worth the money they cost, today's educators find that they are constantly called on to justify the effectiveness of their programs.

The kinds of evidence that health educators have been required to assemble regarding program effectiveness have, almost without exception, involved the use of various kinds of assessment instruments. Consonant with that requirement, this handbook contains numerous tests and inventories designed to secure the evidence needed to judge the effectiveness of nutrition programs. The handbook's measuring instruments were created specifically to assess important goals of the most common types of nutrition programs offered for adults (in industrial or clinical settings) and for children (in school-related programs).

The handbook, accordingly, makes available to those who operate nutrition programs the assessment tools by which the effectiveness of such programs can be determined. The evidence of program effectiveness currently being demanded of nutrition program personnel can, therefore, be provided by appropriate use of the handbook's assessment instruments. Moreover, as will be indicated shortly, appropriate use of the handbook's numerous assessment devices can substantially improve the *design* of nutrition programs.

Measurement and Program Design

Historically, assessment devices have been thought of as instruments to be used *after* a program was concluded. Teachers, for example, have traditionally administered tests *after* instruction was over in order to grade students. However, even though assessment instruments have often been post-instruction creations of instructors, such instruments can make important – often overlooked – contributions to the original design of an instructional program. Properly developed assessment tools, in fact, can contribute to program design in two significant ways.

First, because assessment instruments are typically intended to measure outcomes of interest, such assessment instruments provide program personnel with a range of potential outcomes. An increased range of possible program outcomes generally leads to the *selection*

of more defensible outcomes for health education programs. To illustrate, there may be an assessment instrument dealing with an attitudinal dimension that, were it not for the measuring instrument's availability, might have been overlooked by the program staff. Stimulated by the assessment tool's availability, however, the program staff can add the attitudinal dimension to the program's targeted outcomes.

A second program-design dividend of properly constructed assessment tools is that they *clarify intended program outcomes* and, thereby, make possible the provision of more on-target program activities than would have been the case had such clarification not been present. To illustrate, suppose that program personnel intend to feature in their evaluation an assessment device focused on a specific nutrition-related skill. By becoming familiar with the composition of that assessment tool, the program staff can be sure to incorporate truly relevant practice sequences in their instructional program. Provision of appropriate instructional practice for participants need not reflect "teaching to the test" in the negative sense that instructors coach students for specific test items. Instead, providing relevant practice so that program participants attain the program's intended outcomes constitutes an efficient and effective, research-supported form of instruction.

To review, then, the measuring instruments provided in this handbook are intended to assist those who design and those who evaluate nutrition programs. With respect to program evaluation, the measures will yield evidence by which to improve programs as well as determine program effectiveness. With respect to program design, the measures provide a menu of potential program options and, once having been selected, enhanced clarity regarding the nature of the outcome(s) sought.

What the Handbook Contains

There are several key ingredients in this handbook. It should, therefore, prove helpful to readers if the handbook's major sections are presented. Briefly, then, here is a description of the handbook's major components:

Introductory information. In Chapter One, an introduction to the handbook is provided. Because the handbook is intended to be used with nutrition programs, the chapter concludes with several issues specific to health education programs dealing with nutrition.

Program evaluation essentials. Although a number of people who use this handbook will already be familiar with the nature of program evaluation, many handbook users will not be well versed in the conduct of program evaluations. Accordingly, in Chapter Two, an introduction is provided to the key operations involved in program evaluation. Although space limitations preclude a detailed exposition of all aspects of program evaluation, emphasis is given to the role that assessment instruments play in the gathering of information needed for defensible evaluations.

Assessment instruments. Chapter Three contains the handbook's most important components, namely, the measuring tools designed to be used in the evaluation and design of nutrition programs. These measures deal with behavior, knowledge, skill, and affective outcomes. *Behavior* measures focus on actual behaviors of program participants. *Knowledge* measures are concerned with participant mastery of a defined set of information. *Skill*

measures deal with cognitive, that is, intellectual competencies to be mastered by program participants. Finally, *affective* measures assess participants' attitudes and values.

Each measure is introduced by a brief description of the purpose of the assessment instrument, as well as procedures for administering, scoring, and analyzing the resulting data. All measures have been provided on detachable pages. At the beginning of Chapter Three, an overview description of the chapter's measures is provided to facilitate the selection of measures.

Local measure appraisal. Although the measures contained in this handbook have been created with considerable care and were pilot tested in small-scale tryouts, the measures have not yet been subjected to a formal empirical appraisal of their technical adequacy. Thus, in Chapter Four, a description is provided of how such technical appraisals of the handbook's measures can be carried out.

Annotated bibliography. Because evaluators and designers of programs in nutrition may wish to consult additional sources regarding program design and evaluation, an annotated bibliography is provided in Appendix C to facilitate the handbook user's selection of such materials.

Amplified content descriptors. The information eligible for inclusion in the knowledge measures is provided in Appendix A as amplified content descriptors. Additional content that can be used for the generation of new items is also presented. These descriptors, however, are not exhaustive accounts of nutrition content.

How to Use the Handbook

The particular ways in which the handbook is used will vary from setting to setting and from user to user. For instance, if a handbook user is relatively unfamiliar with the core notions in program evaluation, then a thorough reading of Chapter Two's treatment of program evaluation essentials is warranted. In addition, further reading based on the evaluation-related references included in the annotated bibliography would also seem useful.

For handbook users more familiar with program evaluation, primary attention will probably be focused on Chapter Three's measures. Although use of the measures will vary from situation to situation, a common four-step usage pattern is depicted in Figure 1.1.

Note that in Step 1, the measures are used to represent a range of potential program objectives. Clearly, an expanded range of options can lead to more appropriate decisions regarding what program objectives to pursue. In Step 2, after the measures for possible program evaluation have been reviewed, one or more measures are selected for use in the evaluation of the program. In Step 3, after the program evaluation measures have been selected, the program staff studies the measures intensively to discern if there are program design implications to be drawn from the measures. In Step 4, the measures are administered using one of the evaluative data-gathering designs described in Chapter Two and scored according to the scoring directions in Chapter Three. Finally, interpretations of the results are made.

It is important to remember that the handbook's measures are to be used for program evaluation, not individual decision making. Thus, if one of the handbook's affective

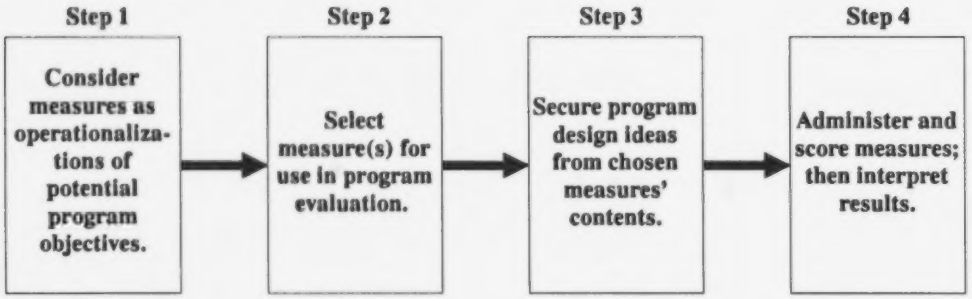
Step 1
Consider measures as operationaliza-tions of potential program objectives.
Step 2
Select measure(s) for use in program evaluation.
Step 3
Secure program design ideas from chosen measures' contents.
Step 4
Administer and score measures; then interpret results.

Figure 1.1: A four-step usage pattern of the handbook's measures

measures was used on a pretest-posttest basis, it is the *aggregation* of scores on the measure that provides us with an indication of the program's effectiveness. The measures were not designed to yield an accurate indication of an *individual* participant's status. Thus, it would be inappropriate to attempt to determine an individual participant's attitudes on the basis of the handbook's measures. The measures are relatively brief instruments designed to be administered without great intrusiveness. When the measures' scores are viewed in the aggregate, the measures can provide data of relevance to program evaluators. The data, however, should *not* be used for determining the status of individuals.

Another point related to use of the handbook's measures concerns the potential *reactivity* of certain measures, that is, the likelihood that if the measure is used *prior* to the program, the experience of completing a measure may cause participants to react differently to the program than had the measure not been administered. Reactivity is more frequently associated with affective measures rather than cognitive measures. Thus, handbook users will need to be alert to the possibility that a given measure, if administered prior to the program, will unduly sensitize participants to an aspect of the program.

To avoid such reactive effects, program personnel may need to divide participants into two subgroups so that only a portion of the participants receive any given potentially reactive measure. Such subgroups would not be given the same reactive measure both before and after the program. Rather, participants should be administered only post-program measures that they had *not* been given prior to the program. Indeed, two potentially reactive measures may be administered simultaneously under the conditions represented in Figure 1.2, where it can be seen that the pre-program performance of certain participants (one-half, for example) serves as a comparison for the post-program performance of other participants. Although a variety of data-gathering designs will be described in Chapter Two, the evaluator should employ care in using the handbook's measures so that they permit reasonable inferences regarding program effectiveness. Potential reactivity of measures should be examined when considering such designs.

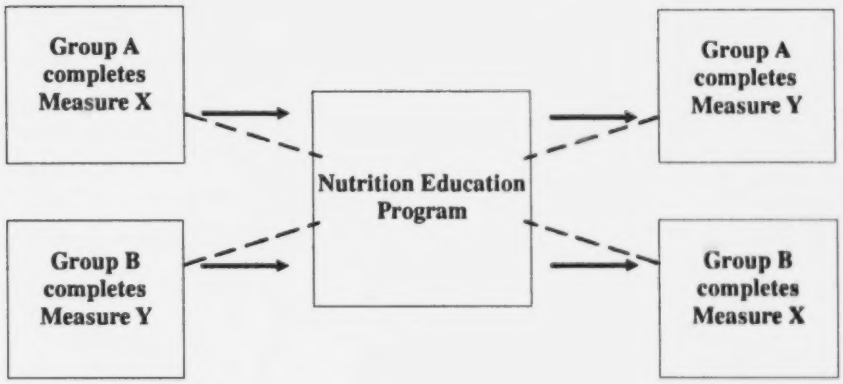
Group A completes Measure X
Group B completes Measure Y
Nutrition Education Program
Group A completes Measure Y
Group B completes Measure X

Figure 1.2: Using the handbook's measures to avoid reactive effects (Appropriate Comparisons = – – –)

Technical Quality of the Handbook's Measures

The measuring instruments to be found in Chapter Three were carefully constructed by an experienced test-development agency according to the guidance of prominent experts in the field of nutrition. All of Chapter Three's assessment devices were subjected to small-scale tryouts, revised on the basis of those tryouts, and reviewed by nutrition specialists.

At the outset of this handbook development project, it had been anticipated that all of the handbook's measuring instruments would be subjected to large-scale field tests so that substantial empirical evidence regarding the technical quality of the measures could be made available to handbook users. Unfortunately, that phase of the project could not be completed.

Thus, handbook users should be cautioned that, although the handbook's measures were developed with great care, there is currently no evidence available by which to ascertain the technical quality of the measures. Thus, handbook users must exercise caution in the use of Chapter Three's assessment instruments. In Chapter Four, as indicated earlier, a description is presented of the ways in which users of the handbook's measures, if they wish to do so, can carry out local studies regarding the technical quality of the measures that they find most suitable for their use.

Specific Nutrition Education Concerns

This handbook is intended to help those who design and evaluate nutrition programs. It is *not* intended to transmit content dealing with nutrition. For those readers who wish to acquire information regarding nutrition-related content, the references following the amplified content descriptors in Appendix A may prove useful. Before proceeding to evaluation considerations, there are several important nutrition-specific issues that warrant further discussion.

A shift in focus. The focus of nutritional sciences has shifted over the years. Most nutrient deficiency diseases prevalent early in this century are rarely seen today. Rather, nutritional factors are now associated with numerous chronic diseases, several of which are leading causes of death in the United States (U.S. Department of Health and Human Services, 1988). For example, the relation of diet to coronary heart disease has been the subject of extensive research for many years. According to the Surgeon General's report, *Healthy People* (U.S. Department of Health, Education, and Welfare, 1979), the role of saturated fat and cholesterol has been established in the development of atherosclerosis and cardiovascular diseases. Even though progress has been made in understanding the role of dietary factors in chronic diseases, the relationship has not yet been fully defined. Consonant with the shifting focus in nutritional science, the measures developed for this handbook target general eating patterns rather than specific nutrients and their role in the diet.

Dietary guidelines. Despite the fact that there are many unanswered questions regarding the connection between diet and certain chronic diseases, the United States Departments of Agriculture and Health and Human Services published a revised set of dietary guidelines in 1985 entitled *Nutrition and Your Health: Dietary Guidelines for Americans*. The guidelines, suggested for healthy people, are provided below.

- Eat a variety of foods.
- Maintain desirable weight.
- Avoid too much fat, saturated fat, and cholesterol.
- Eat foods with adequate starch and fiber.
- Avoid too much sugar.
- Avoid too much sodium.
- If you drink alcoholic beverages, do so in moderation.

Publication of these guidelines was not without controversy. Those who oppose the guidelines feel that there is not enough scientific evidence to recommend dietary changes for diseases that are only partially related to nutrition. Those in favor of the guidelines, on the other hand, believe that current evidence supports such recommendations. For additional information regarding this issue, see *The Nutrition Debate: Sorting Out Some Answers* (Gussow & Thomas, 1986).

The *Dietary Guidelines* cover a variety of topics and could prove quite useful for teaching. Indeed, several of the measures developed for this handbook, such as **Selecting Foods for Your Health** and **Making Diet Changes**, are based on the concepts promoted in the *Dietary Guidelines*.

A heightened interest in nutrition. Currently, there is an intense interest in the subject of nutrition. This heightened interest provides a unique opportunity for health education in the field of nutrition. Unfortunately, it also provides fertile ground for charlatans. Clearly, there is a need for effective nutrition education programs that promote sound nutritional practices and provide clarification regarding what *can* and *cannot* be expected from such practices. Hopefully, this handbook will be useful to health professionals involved in the development

and implementation of such programs. Procedures for evaluating the effectiveness of nutrition education programs are described in the next chapter.

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Gussow, J.D., & Thomas, P.R. (1986). *The nutrition debate: Sorting out some answers.* Palo Alto, CA: Bull.

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CHAPTER TWO

Essentials of Program Evaluation for Health Educators

Essentials of Program Evaluation for Health Educators

Education programs are intended to help people. Public school programs, for example, are intended to help youngsters acquire the skills and knowledge that they will need as adults. Similarly, health education programs are intended to promote participants' adoption of beneficial health-related behaviors. Yet, even though an education program might have been well intentioned, how do we know that the goals of the program were realized? Moreover, if a program is not meeting its goals, how can the program be made more effective?

Such questions constitute the core of program evaluation. In essence, evaluators want to discover whether a program has worked effectively and, if not, how it can be made more effective. When evaluation is used to improve programs, it can make a significant contribution to the well-being of program participants and, potentially, to the community at large.

In this chapter, the nature of program evaluation will be considered as it relates to health education programs. The following topics will be discussed:

- Focusing the Evaluation
- Rights of Participants
- Selecting Appropriate Measures
- When to Administer Measures
- Data-Gathering Design Options
- Sampling Considerations for Data Collection
- Data Analysis
- Reporting Results

The purpose of this chapter is not to promote a particular evaluation model for health education programs. Rather, the chapter deals with considerations central to any evaluation effort. It is hoped that evaluators* of nutrition programs will be able to apply the chapter's contents to their endeavors.

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* Sometimes a program evaluation will be conducted by an individual not affiliated with the program itself – an individual formally designated as a program evaluator. More frequently, however, an evaluation will be carried out by the personnel who are actually operating the program. Whenever the term "evaluator" is used in this handbook, it will refer both to the evaluator-specialist and to the program staff member serving as evaluator.

Focusing the Evaluation

The results of a program evaluation can be used to improve decisions about programs. Anyone setting out to evaluate a health education program, therefore, should focus the evaluation on the *decisions* that are likely to be made about the program, either while the program is being implemented or when it is concluded. In other words, if evaluators know what decisions are apt to be faced by those who will use the evaluation's results, then information bearing on those decisions should, if possible, be collected during the evaluation. To determine what these decisions are, an evaluator needs to have a clear understanding of the purpose of the program, the specifics of the program, and the individuals or groups who may use the evaluation's results. Focusing the evaluation involves considerations such as (a) the nature and role in the evaluation of program objectives, (b) the summative and formative functions of evaluation, (c) the cost of the program, (d) the extent to which observed changes in participants will be attributed to the program, and (e) the extent to which program effects will be generalizable to other situations. Each of these considerations is discussed below.

Objectives and evaluation. Health education programs are designed to bring about worthwhile effects. Most health education programs, therefore, are organized around some form of program objectives that focus on such intended effects. In general, the more clearly these objectives are stated, the more useful they will be in carrying out an evaluation.

One way of conducting an evaluation is to determine the extent to which a program's objectives have been achieved. Program designers too frequently describe their objectives in such ambiguous, general ways, however, that it is impossible to tell whether such loosely defined objectives have been attained. It is for this reason that it can be beneficial for evaluators to work with program personnel, prior to program implementation, to create program objectives that clearly describe desired post-program participant behaviors.

Another potential pitfall when creating program objectives is the tendency to delineate a set of hyper-detailed objectives. Specificity does not automatically yield utility. Instead, decision makers can become overwhelmed by long lists of low-level, albeit behaviorally stated, objectives. For example, a program objective that participants be able to identify eggs as a source of zinc encourages the development of numerous small-scope objectives. Recent thinking regarding instructional objectives suggests that program objectives, *while still measurable*, should focus on larger, more significant types of participant post-program behaviors. A more significant nutrition-related objective, for example, might be that participants be able to recognize appropriate and inappropriate uses of nutrient supplements. Today's health education programs, rather than being organized around 30 minuscule (and, therefore, potentially trivial) objectives, might better be focused on a half-dozen more general, but still measurable, program objectives.

Most evaluators agree, however, that there is substantially more to program evaluation than merely determining whether a program's objectives have been achieved. For example, there may be effects of the program that were not anticipated in the program's stated objectives. Evaluators need to be attentive not only to the effects of a program that were anticipated, but also to any unforeseen program effects.

Summative and formative functions. Summative evaluation addresses the question of whether a program, in its complete and final form, is effective. The decisions associated with the summative evaluation are essentially go/no-go decisions, such as whether to continue a health education program or, perhaps, whether to disseminate the program more widely. *Formative evaluation* addresses questions associated with improving a program that is "under development," that is, still modifiable. The decisions associated with formative evaluation focus on ways to improve particular parts of the program. Formative evaluation is an ongoing endeavor conducted as the program is designed, installed, and maintained. Whereas summative evaluation's mission is to provide a final judgment about a program's overall merit, formative evaluation's mission is to bolster a program's quality on a continuing basis. The effective formative evaluator functions less as an external judge and more as a collaborating member of the program team. The formative evaluator's task is to monitor the program so that it can be improved.

Almost all programs are, at least to some degree, modifiable. Hence, only in rare cases do evaluators appraise a health education program in its complete and final form. One such instance might involve a materials-based nutrition education program. For example, if the program were found to be effective via a summative evaluation, a commercial publisher would distribute the program's materials nationally. In most cases, however, health education programs can be modified and improved. Thus, a formative, improvement-oriented evaluation can be carried out for most health education programs.

Cost-analysis considerations. Program evaluators are often so concerned about detecting the effects of programs that they fail to consider the *costs* of those effects. Yet decision makers need information regarding not only the effects of a program, but also the resources required to achieve those results. For this reason, program evaluators should carefully isolate and communicate the relative costs of programs. For example, information should be collected that can show how much Program A costs to produce a given result compared to the cost of Program B to produce a comparable result. Judgments about a program's impact without considerations regarding its costs are potentially superficial. In recent years, there has been much attention to cost-analysis strategies. Although consideration of those procedures is beyond the scope of this handbook, serious evaluators of health education programs would do well to delve more deeply into cost-analysis procedures.*

Attributing observed changes to the program. Characteristically, an evaluation seeks to determine whether individuals have changed as a result of their participation in a program. The key issue is whether pre-program to post-program changes in the status of participants are attributable to the program itself or to other extraneous factors. Examples of extraneous factors are participants' maturation, their familiarity with the measures used in the evaluation, or their reactions to non-program events such as a health-related mass media campaign. This issue revolves around the evaluator's ability to properly infer that the

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* For additional information about cost-analysis approaches, see Annotated Bibliography Nos. 1, 28, and 29.

program itself caused any observed changes in participants. Technically, the degree to which evaluators can validly infer that a program caused a set of observed changes is referred to as the *internal validity* of the evaluation study. Ideally, an evaluation's data-gathering design should help to rule out explanations other than the program itself for observed changes. (Data-gathering design options are discussed later in this chapter.) If evaluators are unable to attribute observed changes to the program, they will have difficulty in determining program quality.

Generalizing program effects. A related issue is the extent to which the findings of an evaluation study can be generalized to other situations. The issue here is whether the program would be expected to produce similar results with, for example, a different group of participants, slight variations in the program, or changes in program personnel. The degree to which the results of an evaluation study can be generalized elsewhere is technically described as the study's *external validity*.

If evaluations are generalizable, they can provide useful information to (a) program personnel regarding the range of conditions under which the program is effective and (b) other health educators who may wish to adopt an already "evaluated" health education program. A nutrition program that works well in one setting may provide helpful guidelines for those wishing to operate other nutrition programs. Typically, however, a local evaluation should be conducted once the program has been adopted.

It is important to distinguish between a program's causative power and the program's generalizability, because different information may be required to establish each factor. Procedures that limit the number of extraneous variables in the evaluation (e.g., including only males) increase internal validity but, at the same time, limit generalizability. Evaluators must try to balance the problems associated with threats to internal and external validity by selecting a data-gathering design that best addresses the information needs of program personnel as well as of those external to the program who may be interested in adopting the program elsewhere.*

Rights of Participants

Health education programs are designed to improve individuals' health and well-being. When such programs are evaluated, therefore, the focus is typically on a program's impact on human beings. Some evaluators, however, become so caught up with the importance of appraising a health education program that they overlook the rights of the individuals who take part in the evaluation. Two important rights are those of informed consent and confidentiality.

Informed consent. Evaluators, just as researchers, should be guided by a profound respect for human dignity. Therefore, they should not engage in evaluative activities that in any way demean participants. Prominent among the considerations that should guide evaluators is

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* For additional information about internal and external validity issues, see Annotated Bibliography Nos. 8, 11, 12, and 16.

the concept of *informed consent*. Informed consent requires that an evaluator secure, in advance of the study, permission from the participants in an investigation to gather data from them. This consent is obtained *after* the potential participants have learned about the nature of the investigation and what their role would be, because that information may influence their decision to participate. Informed consent eliminates the possibility of making individuals unknowingly serve as subjects in an evaluation.

Two different approaches to securing informed consent have been employed by program evaluators. The first of these, *active informed consent*, obliges an evaluator to obtain, in writing, a statement from each participant indicating that the individual is willing to participate in the evaluation. The significant aspects of the evaluation must be described in the written permission form so that potential participants are fully informed when they give their consent.

An evaluator using the second approach, *passive informed consent*, supplies descriptions of the evaluation's essentials to all program participants and provides them an opportunity to register, in writing, their unwillingness to participate in the study. In other words, when a passive informed consent approach is used, participants return the forms supplied to them only if they are *not* willing to participate in the evaluation study. Of the two approaches, the active informed consent strategy typically results in fewer participants because those individuals who do not provide consent forms must be excluded from the study. Because evaluators who conduct studies involving school-age children are obliged to secure informed consent from underage participants' parents or guardians, a passive informed consent strategy is often adopted due to the difficulty of securing active informed consent from individuals who are not participating in the program themselves.

Procedures for developing forms for both of these approaches to securing informed consent are described in Appendix B. The actual forms to be used in an evaluation would need to be created so that they are more specifically relevant to the program involved.

Confidentiality. Another consideration when dealing with human subjects is the *confidentiality* of all information gathered during an evaluation. Because the evaluator is not concerned with an appraisal of individual participants but, rather, with gauging the effectiveness of a health education program, ensuring participant confidentiality usually poses no problem. Evaluators must, however, devise protective safeguards, such as anonymous completion of forms and careful handling of data, to ensure both the appearance and reality of confidentiality.*

Selecting Appropriate Measures

Although there are various approaches to program evaluation, almost all share one common feature, namely, the systematic gathering of evidence regarding a program's effects. To secure evidence of program effects, evaluators usually employ measurement

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* For additional information about the rights of human subjects and the ethics of evaluation, see Annotated Bibliography Nos. 2, 26, and 38.

instruments. Some instruments, however, are far more suitable for assessing a program's effects than others.

Criterion-referenced measurement. For more than two decades, educational measurement specialists have directed increasing attention toward an emerging form of assessment known as criterion-referenced measurement. In comparison to norm-referenced measurement, which attempts to ascertain an examinee's status in relation to the status of other examinees, criterion-referenced measurement attempts to ascertain an examinee's status in relation to a clearly defined set of behaviors. The essence of a criterion-referenced instrument is the clarity with which its accompanying descriptive materials explain what is being measured. Because norm-referenced instruments emphasize *relative* comparisons among examinees, they often do not provide a clear description of exactly what it is they are assessing. In contrast, criterion-referenced instruments are *absolute* measures, designed to determine exactly what it is that examinees can or cannot do, without reference to the performance of other examinees. Thus, criterion-referenced tests provide a clearer description of what they are measuring.

It is the clarity regarding what is being assessed that renders criterion-referenced measures ideal for the evaluation of health education programs. Consistent with the mission of providing useful information for decision makers, criterion-referenced instruments describe the precise nature of what is being measured. Hence, when criterion-referenced measures are used to gather evidence in program evaluations, decision makers can accurately interpret the evidence being supplied.*

Attributes of well-constructed measures. All instruments, whether norm-referenced or criterion-referenced, should measure what they are measuring with consistency. The consistency with which an instrument measures is known as its *reliability.*** There are several different indices that can be computed to reflect an instrument's reliability. The kind of reliability data needed to appraise a measure for possible use in an evaluation study should be consonant with the way the measure will be used in that study. If a measure is to be used on a test-retest basis, for example, then information about that type of reliability is germane. If alternate forms of a test are to be used, for instance, in a pretest-posttest situation, then evidence should be available regarding alternate-forms reliability so that the evaluator can determine whether or not the two different forms are sufficiently equivalent.

It should be noted that when a health education program is being evaluated, attention should be directed to the impact of the program on a *group* of participants. Thus, the consistency to be sought when measurement instruments are used for program evaluation is consistency for a group of participants' scores. When dealing with individual participants, the measures must yield *individual* or diagnostic consistency.

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* For additional information about the nature and development of criterion-referenced measures, see Annotated Bibliography Nos. 7, 24, and 34.

** For information about determining the reliability of measuring instruments, see Annotated Bibliography Nos. 3, 18, 19, 23, 27, and 34.

A second critical attribute of a properly constructed measure is that it yields scores from which valid inferences can be drawn. An instrument is often said to be valid "if it measures what it purports to measure." Such a statement, however, is technically in error. Tests themselves are never valid or invalid. Rather, it is the *interpretations* made from test scores that are valid or invalid.

There are several types of validity evidence, each yielding somewhat different but conceptually related indications about our ability to make valid inferences from a measure. Evidence of validity is, in the opinion of most measurement specialists, the most important consideration in judging the adequacy of measurement instruments. Program evaluators should make sure they are knowledgeable about methods of securing validity evidence.*

A final consideration in appraising the quality of measures used for program evaluation deals with the presence of *bias* in the assessment devices. During the past decade, measurement specialists have become particularly aware that many educational assessment devices contain items biased against particular subgroups, such as ethnic minorities or women. An example of a biased test item would be a knowledge question that, because of peculiarities in its content or wording, is more difficult for women to understand and answer correctly than it is for men, even though the men and women have an equivalent amount of knowledge regarding the particular concept being tested.

Another type of bias that can adversely influence examinee performance arises when test items are offensive to particular groups of individuals. For example, if a test item includes content that is seen to be derisive to members of particular ethnic groups, then examinees from those groups are not apt to perform at their best on the item. Their warranted agitation over the offensive content is likely to interfere with their responses to that item as well as to subsequent items. There are now available both judgmental and empirical techniques for detecting the presence of biased items. These approaches should be used to identify, then eradicate, bias in a measure's items.**

Finally, it is important to note that any given instrument may not possess all of the qualities discussed above. Often evaluators must choose among measures that embody some but not all of the elements described here, that is, (a) descriptive clarity, (b) reliability, (c) validity, and (d) absence of bias. Another important point is that merely because a measure is *labeled* in a particular way, for example, as criterion-referenced or as nonbiased, that does not automatically indicate that it is of sufficient quality to be used in evaluating a health education program. Scrutiny of all aspects of the measure's quality is requisite.

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* For information about obtaining validity evidence regarding measuring instruments, see Annotated Bibliography Nos. 3, 18, 19, 23, 27, and 34.

** For information about methods for avoiding test bias, see Annotated Bibliography Nos. 6 and 33.

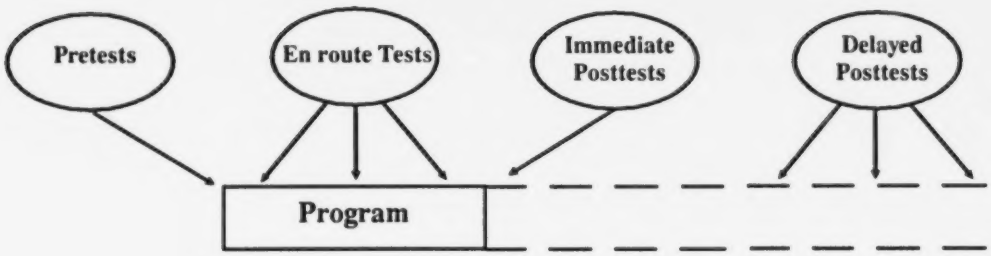

Figure 2.1: Possible measurement times in program evaluation studies

When to Administer Measures

Decisions regarding when to administer measures depend on the data-gathering design selected. Conceivably, there are four temporal periods during which it may be useful to obtain evaluative information about participants of health education programs. There may also be reasons for repeated measurement during some of these periods. These periods are depicted in Figure 2.1.

Pretests. Often it is useful to have information about participants prior to their starting the program. Such information, typically referred to as pretest data, may be used to identify participant needs so that instruction can be targeted directly at those areas. In addition, pretest data can be compared with data collected at the end of a program. Such a comparison can provide a measure of program impact.

En route tests. Measures can also be administered during a program to secure current readings on the status of participants. For purposes of formative evaluation, en route data can be used to redirect resources during the program by providing program personnel with ongoing status-checks on participants' progress. Thus, en route tests may be even more useful than tests administered at the end of the program, because en route measurement provides information while there is still time for program personnel to act on it. This type of assessment is most appropriate for programs of long duration (e.g., several months or more).

Immediate posttests. Measures are commonly administered following a program. The data from posttests can be compared with pretest data to examine changes in participants from the beginning to the end of the program. Participants' posttest performance can also be contrasted with posttest scores from participants in other programs. In addition, posttest data provide an indication of the absolute status of participants on the variables of interest at the completion of the program.

Delayed posttests. Data from delayed or follow-up posttests are often as important or more important than immediate posttest data in evaluating a health education program. Delayed posttest data might be secured, for example, several months after a program's conclusion. Far too frequently data collection efforts are limited to those times when measurement is most convenient. Ultimately, however, health educators should be interested in effecting long-term, rather than short-term, behavioral, affective, and cognitive

changes. It is nearly impossible to infer such long-term changes on the basis of information gathered solely at the end of a program. As indicated in Chapter One, many of the desired changes in participants of nutrition programs represent long-term rather than short-term objectives. For most health education programs, some follow-up measurement is usually warranted.

Clearly, it is not sensible to administer all measures at all time periods. Evaluators, in collaboration with program personnel and other interested parties, need to select a measurement scheme that focuses on the most appropriate times for gathering data. Just as it is desirable to avoid administering an excessive number of different measures, it is also necessary to avoid an excessive number of administrations. It may be useful to administer certain measures (for example, a brief behavioral self-report measure) on a continuing basis; other more time-consuming measures might be administered less frequently. Decisions about when to administer measures should be guided by common sense, attentiveness to participants' feelings, the efficient use of resources, and any conventional expectations, such as when a delayed posttest is ordinarily given.

Data-Gathering Design Options

It is sometimes thought that program evaluations must include complicated and elaborate data-gathering designs in order to yield decisive and compelling data. This is simply not the case. Program personnel and evaluators should try to conduct evaluation studies and gather data in such a way that the ambiguity of results can be reduced to a minimum. That is, evaluations must attempt to determine whether a program works and what makes it work or what prevents it from working. Data-gathering designs serve as the means to this end by setting forth the procedures to be used in exploring the nature and impact of a program.

The data-gathering design that an evaluator chooses for an evaluation will determine the inferences the evaluator can make about a program's overall impact on participants and the effectiveness of its various components. To select the best designs for evaluation studies, evaluators must have a broad knowledge of the available data-gathering design alternatives and the strengths and weaknesses associated with each. Evaluators must also work closely with program staff to determine what decisions are at issue regarding the program. No evaluation study will be perfect; every evaluation leaves some questions unanswered. Evaluators need to be clear regarding what they have learned about a program and the degree of certainty associated with their findings, then convey this information to appropriate audiences.

An important concept related to data-gathering designs is randomization. Randomized selection and assignment are described below, followed by brief descriptions of the most common data-gathering designs available for evaluators of health education programs.

Randomization. One technique that can prove useful to evaluators is *randomization*, which involves the selection or assignment of participants in a nonsystematic manner, such as by using a table of random numbers (found in most statistics texts). A prominent application of randomization in program evaluation is *randomized selection* of subjects. This sort of randomization is particularly important when the evaluator wishes to generalize from the results of a study to a larger population. When the participants taking part in the

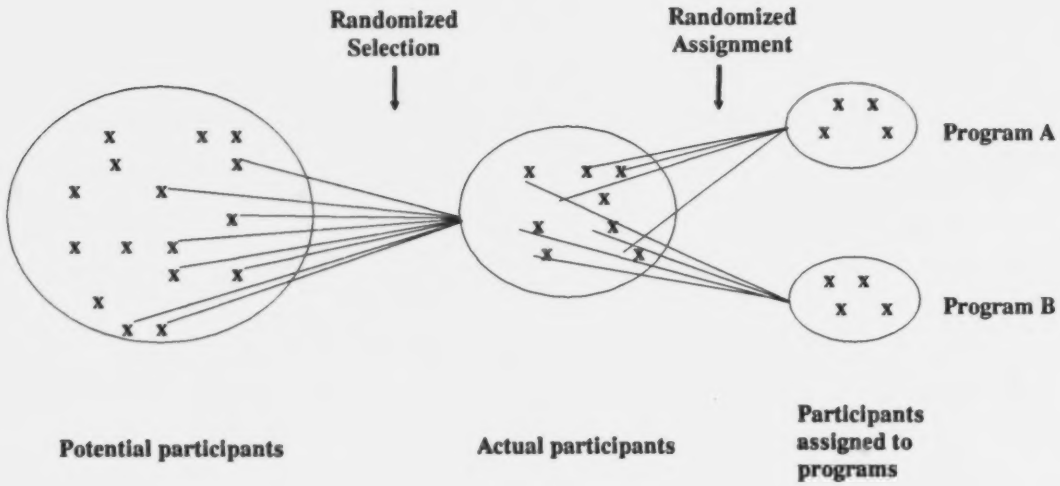

Figure 2.2: Randomized selection of participants from pool of potential participants and randomized assignment of participants to programs

program to be evaluated have been selected at random from a larger population of potential participants, then the evaluator can be reasonably confident that those involved in the evaluation will be representative of that larger population. There is less likelihood that the participants being studied in the evaluation are atypical, which would make it inappropriate to generalize the evaluation's results to the population at large. Randomized selection of subjects may also be useful when there are more applicants than vacancies for a program.

Another use of randomization is to assign participants to different "treatments" or programs. If an evaluator wishes to compare the effects of different treatments, then the evaluator wants the participants in each treatment to be as equivalent as possible. To this end, evaluators can employ a *randomized assignment* procedure whereby individuals are randomly placed in the treatments or programs to be compared.

The two procedures of randomized selection and randomized assignment are illustrated in Figure 2.2. Note that participants are randomly selected from the pool of potential participants, and then randomly assigned to either Program A or Program B.

The use of randomization techniques does not necessarily create equivalent groups. For example, if an evaluator were to randomly assign 50 potential participants in a company's nutrition program to treatment and no-treatment groups, it is still possible that one of the groups would contain individuals who, when pretested, were significantly different in some important aspect from those in the other group. In such instances, evaluators must rely on statistical procedures in an effort to compensate for such disparities. In most cases, however, use of randomization will create groups of sufficient equivalence that such statistical adjustments are not needed.

In practice, program personnel often may not have the luxury of constituting groups via randomized selection or assignment. For example, local school board policies might require that *all* youngsters be provided with any program regarded as potentially beneficial. When randomization is not used, it is especially important to collect and examine descriptive data about participants to determine where pre-program group differences occur and to consider the ways in which such differences may influence post-program data. Even if randomization is impossible, attempts to constitute comparison groups with individuals as equivalent as possible can help minimize the influence of preexisting participant differences.*

Seven different data-gathering designs of potential utility for evaluators of health education programs will be presented below. Each data-gathering design will be described and depicted schematically. Some of the major factors involved in the selection of data-gathering designs will be addressed.

The case-study design. Consider a six-week health education program aimed at modifying participants' knowledge about the effects of nutrition on health. If participants' knowledge were measured only at the close of the program, we could describe the data-gathering approach as a *case-study design* and represent it schematically as shown in Figure 2.3.

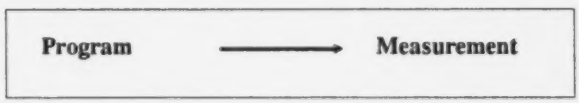

Figure 2.3: Case-Study Design

If this were the design employed in an evaluation, what could an evaluator tell about the program's impact on participants' knowledge? How confident would an evaluator be that participants' knowledge about the effects of nutrition on health was attributable to the program?

It would be difficult to attribute, with confidence, any effects to the health education program. The program, indeed, may have been totally ineffectual. In fact, participants' post-program knowledge might be identical to their knowledge before the program. The participants could be demonstrating knowledge that they brought to the program, not that they acquired during the program. Because we have no measure of participant knowledge prior to the program, we cannot distinguish between preexisting knowledge and knowledge acquired as a result of the program. Hence, with the case-study design, it may be impossible to determine whether the program had any impact on participants.

Even though attributions of causality are often unwarranted, it may be possible to secure useful program evaluation data with such a data-gathering design. Suppose, for example, that a health education program is promoting a body of knowledge so advanced that few, if

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* For additional information about randomization, see Annotated Bibliography Nos. 8 and 25.

any, individuals would be familiar with it. In such a setting, one could assume that participants' post-program knowledge is attributable to the program's impact because participants would almost certainly not have acquired the knowledge without the program. It might not be worth the resources necessary to implement a data-gathering design capable of conclusively demonstrating that participants began the program unfamiliar with the knowledge being promoted.

This example illustrates an important data-gathering consideration, namely, that the chief mission of data-gathering designs is to *rule out plausible rival explanations*, that is, explanations other than the program's impact that might account for the post-program status of participants. If there is reason to believe that participants' pre-program status may account for their post-program status, then a data-gathering design should be selected that permits the evaluator to rule out this rival explanation.

The one-group pretest-posttest design. Now suppose that, to avoid the major shortcoming of the case-study design, an evaluator measures participants' behavior both before and after a health education program. This data-gathering approach can be described as a *one-group pretest-posttest design* and can be represented as shown in Figure 2.4.

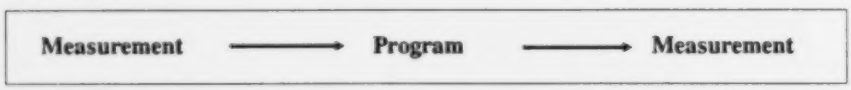

Figure 2.4: One-Group Pretest-Posttest Design

Assume an evaluator uses the one-group pretest-posttest design and that the data reveal a substantial shift toward more desirable behaviors between the initial and the final measurement. Can this change in behaviors be ascribed to the program? Unfortunately, the evaluator cannot be sure. There are many other factors, totally unrelated to the program, that may have influenced participants' behaviors. For instance, if a nutrition program emphasized the relationship between nutrition and health, and at the same time the latest research linking nutritional factors to certain diseases received attention in the national news, such an event may have influenced participants' views. Evaluators of programs that serve children must also consider the possible effects of maturation during the time the program is offered. Participants' increased maturity may cause pre-program to post-program shifts in behaviors. The program itself may have contributed nothing to the measured shift of behaviors. Such extraneous factors decrease the evaluator's ability to draw defensible conclusions about the program's impact.

As was true with the case-study design, however, if there are no plausible rival explanations for the posttest results, the one-group pretest-posttest design can be suitable for the task at hand. In fact, this simple yet serviceable design is often used in formative evaluation.

The one-group pretest-posttest design requires measurement before as well as after a program. This points to a commonly accepted but often overlooked principle of effective program evaluation. Evaluation is most effective when it is initiated at the beginning of a

program. If evaluators are not called in until the end of a program, they may be hampered in their efforts to design a credible program evaluation.

The nonequivalent control/comparison group design. Program evaluators can eliminate some of the more common rival explanations for changes in participants' behaviors by using data-gathering designs in which either comparison or control groups are employed. The use of a control group (untreated individuals) or a comparison group (individuals receiving a different program) requires two groups that are assumed to be relatively similar (before the program) on all related variables. When using these designs, the evaluator should attempt to secure two groups that are as similar as possible. Because the two groups are not randomly assigned to the two conditions, however, they cannot be assumed to be *equivalent*, hence the design's designation as a "nonequivalent" control or comparison group design.

In the control-group version of this design, only one of the groups is given the program to be evaluated; the other group is left untreated. This data-gathering design, known as the *nonequivalent control group design*, is illustrated in Figure 2.5.

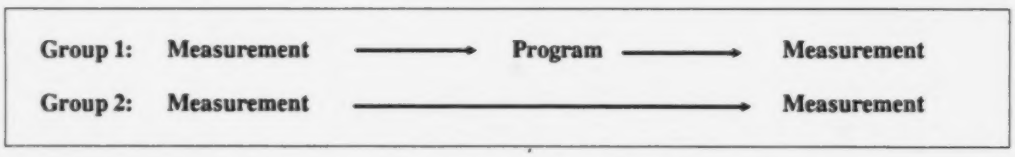

Figure 2.5: Nonequivalent Control Group Design

In this design, a control group (Group 2) is assessed before and after the program, but it never receives the program itself. Assuming that the groups were similar before the program, if the program participants' behaviors change while the behaviors of those in the control group remain the same, the evaluator can be reasonably confident that the program caused the change.

The use of an *untreated* control group may strike some health educators as a particularly unsavory data-gathering ploy. After all, health educators design their programs to benefit participants. To withhold such programs from individuals, even for the important purpose of evaluating the program's effectiveness, seems downright reprehensible. Yet, the individuals from whom the program is withheld, that is, the members of the control group, can be given the program *subsequently*, as soon as the evaluation study has been concluded. Also, in some situations there are more program applicants than can be accommodated, and, therefore, some prospective participants must be denied access to this program under any circumstances. Those who are not admitted to the program could be used as a control group, and admitted to the program the next time it is offered.

A variation of the nonequivalent control group design involves the use of a comparison group, that is, a group receiving a different program or a different treatment. Program evaluators frequently find themselves studying the quality of two or more competing programs. Thus, the evaluator focuses on the relative virtues of two or more different programs rather than on a contrast between a single program and an untreated control group. A schematic depiction of a *nonequivalent comparison group design*, in this instance

contrasting two different programs, is presented in Figure 2.6. As indicated above, more than two groups can be employed when using a nonequivalent comparison group design. An evaluator using this design can be fairly certain that, if the groups were similar before the program, any differences in post-program behaviors are due to the differential impact of the two programs.

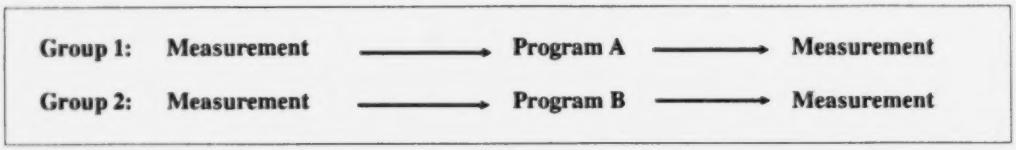

Figure 2.6: Nonequivalent Comparison Group Design

There are, however, potential problems with the nonequivalent control/comparison group designs. It may be that the initial measurement was *reactive*. A reactive measurement is one that, by itself or in combination with the program, influences participants' behavior. Attitude inventories and self-report questionnaires about behavioral practices are notoriously reactive. For example, a questionnaire administered before the program might alert participants to the importance of a desired behavior. This would heighten their attentiveness when the program dealt with content related to that behavior and, as a consequence, influence their performance on the second measurement.

Moreover, measurement is expensive. Measuring the status of control groups requires valuable evaluation resources. Time and money can often be better spent studying the program being evaluated rather than studying a no-treatment control group of little intrinsic interest. Health educators should not ritualistically employ control groups in their designs if the questions at issue can be answered without the use of untreated groups.

The pretest-posttest control/comparison group design. There are two data-gathering designs that are of particular value to program evaluators if randomized assignment is possible. The first of these is the *pretest-posttest control group design*, illustrated in Figure 2.7.

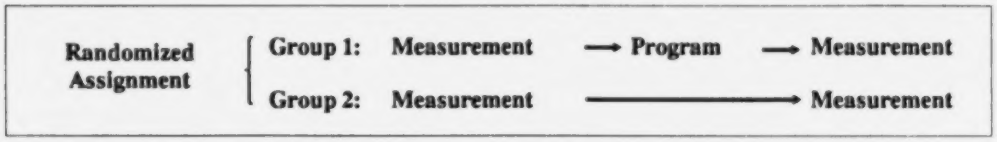

Figure 2.7: Pretest-Posttest Control Group Design

The difference between this design and the previously considered nonequivalent control group design is, of course, the randomized assignment of subjects to the two groups. This feature of the design is a particularly important one, because creation of two or more groups using randomized assignment is an effective way of promoting equivalence between the groups, especially if the number of subjects in each group is large (say, 30 or more). Equivalence of groups at the beginning of the program strengthens the inference that any differences at the conclusion of the program are due to program impact.

By using comparison groups, that is, two or more program groups, instead of an untreated control group, the evaluator would be using a *pretest-posttest comparison group design*, shown in Figure 2.8.

Because pretests are used in both of these designs, the possibility of reactive pre-program measures is still present. For situations in which reactivity is of great concern, a different data-gathering design, described next, has much appeal.

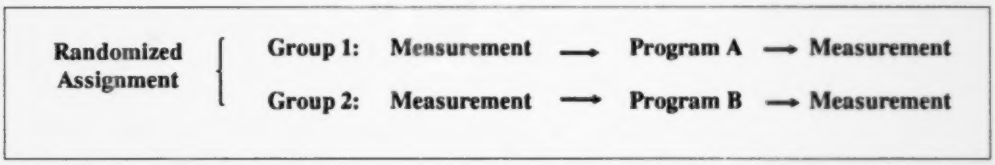

Figure 2.8: Pretest-Posttest Comparison Group Design

The posttest-only control group design. In situations where a measure is likely to be reactive, the evaluator can rely on a clever data-gathering design that effectively dodges the reactivity problem. This *posttest-only control group design* is depicted in Figure 2.9. This design is the same as the pretest-posttest control group design, except that there is no pretest.

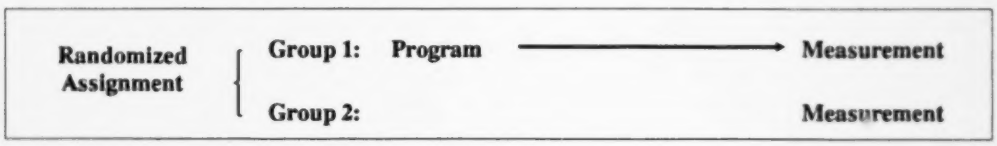

Figure 2.9: Posttest-Only Control Group Design

In this design, neither Group 1 nor Group 2 is pretested, but because of random assignment the groups can be considered equivalent prior to Group 1 receiving the program. Not pretesting Group 1 effectively avoids a pretest's potentially reactive effect on program participants. To assess the impact of the program, it is possible to contrast the *posttest* performances of Groups 1 and 2. As with the other control group designs, the untreated control group could be given the program the next time it is offered.

The basic dividend of the posttest-only control group design is that by measuring an untreated, randomly assigned control group, the evaluator secures an estimate of how program participants would have responded on a pretest, but without introducing the potentially reactive effects of a pretest. Although the diagram for this design suggests that the measurements be made for both groups at the conclusion of the program, it is possible to measure the untreated control group earlier if that seems advisable.

Multiple measures over time. There are certain situations in which health educators may wish to appraise the effects of their programs on the basis of periodic measurements, for example, by using regularly administered questionnaires or data that are routinely recorded.

For instance, suppose when evaluating a "nutrition awareness" program, the evaluator was interested in the eating patterns of a company's supervisors. The evaluator might collect and study dietary recall data at periodic intervals before, during, and after the program. By comparing the dietary patterns during different time intervals, the evaluator would have valuable information regarding program effects.

A number of the most commonly used data-gathering designs have been described. There are other, more complex designs than those treated here.* Complexity, however, is rarely an asset if a more straightforward design is appropriate.

Sampling Considerations for Data Collection

The data-gathering requirements of an evaluation can become a burdensome intrusion into an ongoing health education program. Accordingly, evaluators should conduct their data-gathering activities in the least intrusive manner possible. One way to minimize an evaluation's intrusiveness is by relying on sampling techniques, such as person-sampling and item-sampling, each of which is described below.

Person-sampling. To estimate how a large group of people would respond on a particular measure, it is not necessary to administer the measure to all the individuals in the group. Instead, a smaller group can be selected. This smaller group can be either a *simple random sample* or a *stratified random sample*, that is, a sample stratified on the basis of program-relevant factors such as age, sex, and socioeconomic status. Assuming that the sample is randomly selected, the evaluator can estimate the status of the total group based on the responses of the sample.

Suppose, for example, that the evaluator wants to use a measure to determine participants' perceived ability to maintain a healthful diet. Assuming that there is a reasonably large number of program participants, say 50 or so, the evaluator could randomly select half of the participants and administer the measure to this group only. In essence, this approach allows the evaluator to infer how the total group of participants would score on the measure, even though only half of the participants completed it. Thus, it is possible to estimate total group performance with only half the amount of participant time required for data gathering.

Using a similar sampling procedure, evaluators can administer two or more measures at once in the time it takes to administer one. Suppose that two measures are to be given to program participants. The evaluator can randomly assign one measure to half of the participants and the other measure to the remaining participants. Each participant needs to respond to only one measure, but the evaluator can derive defensible estimates of how all the participants would have responded on both instruments.

Item-sampling. In addition to sampling persons, as in the previous examples, it is also possible to sample items, so that different sets of items from a program evaluation measure

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* For additional information about evaluation design options, see Annotated Bibliography Nos. 8, 11, 22, 23, and 35.

are randomly selected to be administered to different persons. Using this approach, the evaluator gives each participant only a sample of the items on any particular measure. For example, suppose a program evaluator wishes to administer a 30-item test. Given 60 participants in the program, the evaluator could divide the test into three sets of 10 items each and administer each set of 10 items to 20 different participants. In this way, the total group's performance on the whole test can be estimated. This approach to data-gathering requires only one-third of the time that would have been required to administer the total 30-item test to all participants.

Sample size. Given the relatively small number of participants in some health education programs, is it really appropriate to sample either persons or items? How large must groups be before these sampling procedures can be sensibly used? Unequivocal answers to these questions do not exist. Some texts on sampling provide rules of thumb for estimating the size of samples needed for detecting group differences in relation to the magnitude of differences sought and the nature of the groups being sampled. At best, though, these rules provide only rough estimates. It is important to recognize that the task of identifying a sufficiently large sample is more difficult than usually thought.

The variability of participants' anticipated performance on the measures is the primary determiner of the necessary sample size. If it is expected that participants' scores on a test will be relatively homogeneous, a smaller number of respondents will be needed than if participants' scores are expected to vary widely. Thus, if on a measure of knowledge about safety in food preparation and handling, for example, some of the participants are expected to know many safe food-preparation techniques and others are expected to know very few, reasonably large numbers of participants (e.g., 20) should respond to any one item.

Intuitively, one recognizes that when working with a very small group of program participants, the use of these sampling techniques is risky. For instance, if there were only 15 participants in a program, few evaluators would try to split these participants into three groups of five each for purposes of taking different sets of items. Even though each group represents one-third of the total population, there is too much likelihood that a sample of five individuals would not properly represent the total group. One or two atypical participants in a five-person group would render the group's average performance unrepresentative of how the larger group would have performed.

It should be noted that when employing procedures such as person-sampling or item-sampling, an evaluator is focusing on a group of participants *in the aggregate*. Because evaluations are typically concerned with the effects of programs on groups of participants, the use of sampling procedures is usually appropriate. If, however, program personnel need individual data on all examinees, then sampling should obviously not be employed.*

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* For additional information about sampling procedures, see Annotated Bibliography Nos. 9 and 10.

Data Analysis

A frequent question asked of an evaluator is whether a study's results are statistically significant. For example, could the observed changes in program participants' knowledge or behavior from pretest to posttest have occurred simply by chance? Statistical tests are used to answer this type of question. Consideration of statistical analysis procedures, however, is beyond the scope of this handbook. Thus, just a few comments will be made here regarding data analysis. Because there are many subtle choice-points in the statistical analysis of evaluation data, evaluators who are not well versed in at least the more common statistical procedures should probably enlist the aid of someone who is.

There are two basic classes of statistics, namely, descriptive statistics, such as the mean, and inferential statistics, such as the *t* test. *Descriptive statistics* help evaluators portray a group's performance on a given measure. For example, an evaluator might describe a set of participants' scores via the mean score (the scores' central tendency) and standard deviation of the scores (the scores' variability). Because the mean and standard deviation are frequently used, program evaluators should know how to calculate and interpret them. Any introductory statistics book for the social sciences will serve as a reference for this information. *Inferential statistics* help evaluators determine whether an observed difference between pre-program and post-program scores is *statistically significant*, that is, whether such a difference could have occurred because of chance alone. If the probability is small that the results are due to chance, the evaluator can, with reasonable confidence, attribute the results to the program.

Statistical significance, however, does not imply *practical significance*. A small difference between the average scores of two groups can be statistically significant, particularly when large numbers of participants are involved, yet be of no practical consequence whatsoever. Health educators will need to make sensible determinations regarding whether the magnitude of an observed difference, even though statistically significant, is sufficiently important to warrant action. In other words, although evaluators of health education programs should often carry out statistical significance tests, they should not be unduly swayed by the results of such analyses. Common sense must always be applied in interpreting the meaning of a statistically significant result.*

Reporting Results

Reporting the results of an evaluation study is a more difficult undertaking than is usually recognized. Considerable attention must be given to the procedures employed to report the results of health education program evaluations. When reporting evaluation results, as when focusing and planning the evaluation, the evaluator must be responsive to the needs of program decision makers. A few key considerations should be kept in mind when reporting evaluation results.

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* For additional information about data analysis, see Annotated Bibliography Nos. 25, 36, 39, 43, and 45.

Evaluators must report their results to decision makers in a timely fashion. It does no good to deliver an evaluation report several weeks after key program decisions had to be made. Evaluators must also be careful to disseminate their findings to all appropriate audiences. If possible, an evaluator should circulate the preliminary draft of a program evaluation report to program personnel so that they can react to its accuracy and objectivity.

The decision makers whom evaluators are assisting may have scant experience with quantitative data. As a consequence, complicated statistical presentations may be of little value to them. Evaluators should select data-presentation procedures that will match the technical sophistication of the decision makers involved. In any evaluation report, there is nothing wrong with simple graphs or "percentage correct" tables. The more intuitively comprehensible the data presentation techniques, the better they are. Program evaluators should provide straightforward presentations of data without fearing that such approaches will be regarded as too elementary. Adequate technical back-up can be appended as necessary to the final report.

Evaluators should not be reluctant to make speculations based upon their knowledge about a program, but these conjectures should be identified as such. Similarly, if any of the evaluation's findings are equivocal, the evaluator should inform concerned audiences of this fact. Honesty and objectivity are the hallmarks of effective evaluation reporting.

In addition, because decision makers are typically busy people, evaluators should strive for reasonable brevity in their reports. The preparation of executive summaries to accompany lengthy reports is a useful practice. Voluminous evaluation reports are almost certainly destined to go unread. Terse, easily read reports are much more likely to make an impact on decision makers.

The whole thrust of the evaluation enterprise is to facilitate better decisions. Decision making will *not* be illuminated by complex, lengthy, or otherwise incomprehensible presentations of evaluation results. The quality of decision making can be enhanced only if an evaluation's results are reported in a way that can be clearly understood.*

Reprise

In this chapter, a number of issues almost certain to be encountered by evaluators of nutrition education programs were considered. Because this handbook supplies a number of measures to be used in the evaluation process, special attention was given to the role of such measures in program evaluation. Evaluators desiring more detailed treatments of the topics covered in this chapter will find appropriate sources in the Annotated Bibliography.**

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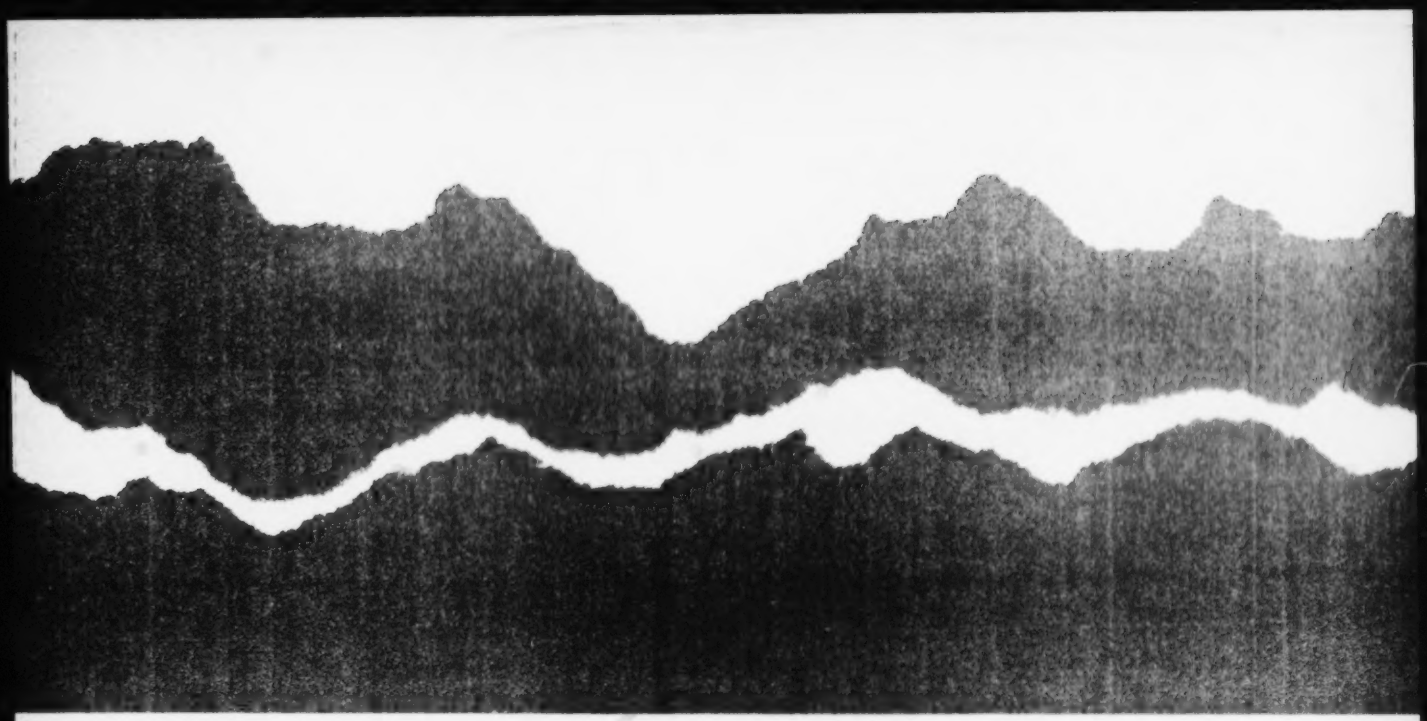
* For additional information about reporting the results of an evaluation, see Annotated Bibliography Nos. 5, 23, 26, and 35.

** For additional information about program evaluation, see Annotated Bibliography Nos. 5, 13, 16, 20, 23, 32, 41, 46, 49, and 51.



CHAPTER THREE

Program Evaluation Measures

Overview Of Measures

Category	Title	Target Group	Description	Page No.
Behavior	**Meeting the Dietary Guidelines**	Adults	Assesses frequency of making various dietary modifications.	38
	Eating Healthful Foods	Adolescents Preadolescents		42
	Maintaining Desirable Weight	Adults	Assesses weight based on gender and height.	46
	Activities Index	Adults Adolescents	Assesses general activity level.	49
	Protocol for Calculating Waist-to-Hip Ratios	Adults	Assesses risk of certain chronic diseases.	53
	Changing Eating Behavior	Adults	Assesses use of techniques for changing eating behavior.	55
	Health Habits and History Questionnaire	Adults	Assesses typical eating patterns.	59

Category	Title	Target Group	Description	Page No.
Knowledge*	**Foods and the Dietary Guidelines**	Adults	Assesses knowledge of the *Dietary Guidelines*, including selecting foods based on the *Dietary Guidelines*.	60
	Selecting Foods for Your Health	Adolescents Preadolescents		66
	Nutrition and the Life Cycle	Adults Older Adolescents	Assesses knowledge of nutritional needs at various stages of the life cycle.	70
	Facts About Vitamin and Mineral Supplements	Adults	Assesses knowledge of appropriate and inappropriate uses of vitamin and mineral supplements.	76
	Facts About Taking Vitamins and Minerals	Adolescents Preadolescents		82
	Safety in Food Preparation	Adults	Assesses knowledge of food preparation and handling practices related to illnesses, such as salmonella.	86
	Preparing Foods Safely	Adolescents Preadolescents		92
	Earth Friends	Adolescents Preadolescents	Assesses knowledge of earth conservation actions.	98

*The informaton eligible for inclusion in the knowledge measures is provided in Appendix A as amplified content descriptors.

Category	Title	Target Group	Description	Page No.
Skill	**Diet Plan Analysis**	Adults Older Adolescents	Assesses ability to categorize foods into food or nutrient groups.	104
	Making Diet Changes	Adults	Assesses ability to identify appropriate dietary changes based on the *Dietary Guidelines*.	118
	Changing Eating Patterns	Adolescents Preadolescents		128
	What's on a Label?	Adults Older Adolescents	Assesses ability to read and interpret nutrition labels.	134
	Modifying Recipes	Adults Older Adolescents	Assesses ability to modify recipes in accordance with the *Dietary Guidelines*.	146
Affective	**Would You Try These?**	Adults	Assesses willingness to try a variety of foods.	157
	What Will You Eat?	Adolescents Preadolescents		161
	Would You Maintain a Healthful Eating Pattern?	Adults	Assesses perceived ability to maintain a healthful diet.	165
	Maintaining a Healthful Eating Pattern	Adults	Assesses intention to maintain a healthful diet.	167

MEETING THE DIETARY GUIDELINES

This behavior measure assesses the frequency with which participants modify their eating patterns in order to eat more healthfully. The measure is appropriate for adults.

PURPOSE

Information regarding the extent to which participants modify their eating patterns may be helpful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results may indicate the need to (a) increase the frequency with which participants consciously modify their eating patterns in a healthful manner and (b) increase the variety of such modifications.
- When administered at the beginning and end of a program, it is possible to evaluate changes in the frequency with which participants make healthful dietary modifications and the variety of such modifications.

PROCEDURES

In most cases, this instrument should be administered both at the beginning and the end of a program. If the program is fairly long (six weeks or more), the instrument may be given as it exists in this handbook. If the program is shorter than six weeks, it is possible that the program will not produce the behavioral changes measured by this instrument. Programs of shorter duration can still use this measure for the purposes listed above; however, the time frame of the measure should be changed from "*past month*" to "*past few weeks*" if program personnel wish to measure pretest to posttest changes.

SCORING AND ANALYSIS

The two approaches that can be used to score this measure include examination of (a) the number of dietary modifications made and (b) the frequency with which such modifications are made.

Method One: Number of times dietary modifications are made

1. For all participants, count the number of items that are marked either **Almost Always** or **Sometimes**. (Ignore any blank, **Hardly Ever, Never**, or **This Does Not Apply To Me** responses.)
2. Divide this total by the number of program participants. The resulting score will be the average number of dietary modifications made by program participants.

EXAMPLE: Imagine that there are 10 program participants. First, count all the times that these 10 individuals marked either **Almost Always** *or* **Sometimes**. *(Assume that the total number of such responses is 55.) Then, divide 55 by the number of participants to get an average score of 5.5 for this measure.*

Scores can range from 0-20. Low numbers indicate that participants make relatively few dietary modifications to eat more healthfully. High numbers indicate participants make numerous dietary modifications to eat healthfully.

Method Two: Frequency with which modifications are made

1. For all participants, count only the items that are marked **Almost Always**.
2. Divide this total by the number of times items were marked **Almost Always** or **Sometimes** (as computed for method one above). Multiply this number by 100 to obtain the percentage of modifications that participants made **Almost Always**.
3. To determine the percentage of modifications made **Sometimes**, subtract the **Almost Always** percentage from 100.

EXAMPLE: For the same 10 individuals used in the example above, count the number of times they marked **Almost Always**. *(Assume the total is 35.) Then, divide 35 by the total number of times the 10 individuals marked either* **Almost Always** *or* **Sometimes**. *(This number was already determined to be 55 in the previous example.) Divide 35 by 55 to determine what percentage of the modifications made are made almost always. In this case, 35/55 is about 64%. Thus, of the modifications made, 64% are made almost always, and 36% are made sometimes.*

MEETING THE DIETARY GUIDELINES

Listed below are ways that some people use to make sure that they eat healthful foods. In the PAST MONTH, how often did you do each of the following things to eat a healthful diet? Check one answer for each activity. If an activity does not apply to you, for example, you do not trim the fat from meat because you don't eat meat, then check THIS DOES NOT APPLY TO ME.

In the past month, how often did you . . .	Almost Always	Sometimes	Hardly Ever	Never	This Does Not Apply To Me
1. eat fruit instead of sweet desserts, cakes, or cookies?	( )	( )	( )	( )	( )
2. eat raw vegetables instead of salty snacks, such as chips?	( )	( )	( )	( )	( )
3. choose whole-grain bread, such as wheat or rye, instead of white bread?	( )	( )	( )	( )	( )
4. cook vegetables without adding salt?	( )	( )	( )	( )	( )
5. taste foods before salting them?	( )	( )	( )	( )	( )
6. trim fat from meat before eating the meat?	( )	( )	( )	( )	( )
7. drink skim or 1% milk instead of whole milk?	( )	( )	( )	( )	( )
8. use margarine instead of butter?	( )	( )	( )	( )	( )
9. broil or bake foods, such as fish, instead of frying them?	( )	( )	( )	( )	( )
10. choose raw vegetables instead of salted, canned vegetables?	( )	( )	( )	( )	( )
11. choose raw fruit or fruit canned in water or its own juice instead of fruit canned in syrup?	( )	( )	( )	( )	( )

In the past month, how often did you . . .	Almost Always	Sometimes	Hardly Ever	Never	This Does Not Apply To Me
12. flavor vegetables with herbs and spices instead of butter or margarine?	( )	( )	( )	( )	( )
13. read food labels to find out fat, sugar, and/or sodium content?	( )	( )	( )	( )	( )
14. substitute low-sodium for high-sodium products?	( )	( )	( )	( )	( )
15. use skim or 1% milk in coffee instead of coffee creamers?	( )	( )	( )	( )	( )
16. remove the skin from chicken before cooking the chicken?	( )	( )	( )	( )	( )
17. substitute plain lowfat yogurt for sour cream or mayonnaise?	( )	( )	( )	( )	( )
18. use little or no butter or margarine on bread or toast?	( )	( )	( )	( )	( )
19. add little or no sugar to coffee, tea, or cereal?	( )	( )	( )	( )	( )
20. use low-calorie instead of regular salad dressing to flavor salads?	( )	( )	( )	( )	( )

EATING HEALTHFUL FOODS

This behavior measure assesses the frequency with which participants modify their eating patterns in order to eat more healthfully. The measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding the extent to which participants modify their eating patterns may be helpful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results may indicate the need to (a) increase the frequency with which participants consciously modify their eating patterns in a healthful manner and (b) increase the variety of such modifications.
- When administered at the beginning and end of a program, it is possible to evaluate changes in the frequency with which participants make healthful dietary modifications and the variety of such modifications.

PROCEDURES

In most cases, this instrument should be administered both at the beginning and the end of a program. If the program is fairly long (six weeks or more), the instrument may be given as it exists in this handbook. If the program is shorter than six weeks, it is possible that the program will not produce the behavioral changes measured by this instrument. Programs of shorter duration can still use this measure for the purposes listed above; however, the time frame of the measure should be changed from "*past month*" to "*past few weeks*" if program personnel wish to measure pretest to posttest changes.

SCORING AND ANALYSIS

The two approaches that can be used to score this measure include examination of (a) the number of dietary modifications made and (b) the frequency with which such modifications are made.

Method One: Number of times dietary modifications are made

1. For all participants, count the number of items that are marked either **Almost Always** or **Sometimes**. (Ignore any blank, **Hardly Ever**, **Never**, or **This Does Not Apply To Me** responses.)
2. Divide this total by the number of program participants. The resulting score will be the average number of dietary modifications made by program participants.

EXAMPLE: Imagine that there are 10 program participants. First, count all the times that these 10 individuals marked either **Almost Always** *or* **Sometimes**. *(Assume that the total number of such responses is 55.) Then, divide 55 by the number of participants to get an average score of 5.5 for this measure.*

Scores can range from 0-15. Low numbers indicate that participants make relatively few dietary modifications to eat more healthfully. High numbers indicate participants make numerous dietary modifications to eat healthfully.

Method Two: Frequency with which modifications are made

1. For all participants, count only the items that are marked **Almost Always.**
2. Divide this total by the number of times items were marked **Almost Always** or **Sometimes** (as computed for method one above). Multiply this number by 100 to obtain the percentage of modifications that participants made **Almost Always.**
3. To determine the percentage of modifications made **Sometimes**, subtract the **Almost Always** percentage from 100.

EXAMPLE: For the same 10 individuals used in the example above, count the number of times they marked **Almost Always.** *(Assume the total is 35.) Then, divide 35 by the total number of times the 10 individuals marked either* **Almost Always** *or* **Sometimes**. *(This number was already determined to be 55 in the previous example.) Divide 35 by 55 to determine what percentage of the modifications made are made almost always. In this case, 35/55 is about 64%. Thus, of the modifications made, 64% are made almost always, and 36% are made sometimes.*

EATING HEALTHFUL FOODS

Listed below are ways that some people use to make sure they eat healthful foods. In the PAST MONTH, how often did you do each of the following things to eat a healthful diet? Check one answer for each activity. If an activity does not apply to you, for example, you do not trim the fat from meat because you don't eat meat, then check THIS DOES NOT APPLY TO ME.

In the past month, how often did you . . .	Almost Always	Sometimes	Hardly Ever	Never	This Does Not Apply To Me
1. eat fruits instead of sweet desserts, cakes, or cookies?	( )	( )	( )	( )	( )
2. eat raw vegetables instead of salty snacks, such as chips?	( )	( )	( )	( )	( )
3. ask for whole wheat bread instead of white bread?	( )	( )	( )	( )	( )
4. taste foods before salting them?	( )	( )	( )	( )	( )
5. drink water, milk, or juice instead of soda?	( )	( )	( )	( )	( )
6. trim fat from meat before eating the meat?	( )	( )	( )	( )	( )
7. ask for skim or 1% milk instead of whole milk?	( )	( )	( )	( )	( )
8. ask for margarine instead of butter?	( )	( )	( )	( )	( )
9. use little or no mayonnaise on sandwiches?	( )	( )	( )	( )	( )
10. use little or no butter or margarine on bread or toast?	( )	( )	( )	( )	( )
11. ask for cooked vegetables without butter or margarine?	( )	( )	( )	( )	( )

In the past month, how often did you . . .	Almost Always	Sometimes	Hardly Ever	Never	This Does Not Apply To Me
12. remove the skin from chicken before eating the chicken?	( )	( )	( )	( )	( )
13. add little or no sugar to cereal?	( )	( )	( )	( )	( )
14. eat baked, broiled, or barbecued fish instead of fried fish?	( )	( )	( )	( )	( )
15. read food labels to find out fat, sugar, and/or sodium content?	( )	( )	( )	( )	( )

MAINTAINING DESIRABLE WEIGHT

This behavior measure can be used to collect information about participants' height, weight, gender, and age. Such information can be used to determine participants' desirable body weight. The measure is appropriate for adults.

PURPOSE

Information regarding participants' body weight may be helpful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, information from this measure may indicate the need to emphasize the link between nutrition and weight control.
- If a program includes a weight loss component, the information from item four can be collected prior to and following the program in order to evaluate participants' weight loss.

PROCEDURES

This instrument should be administered at the beginning of a program. For programs that include a weight loss component, item four should be administered at the end of the program as well.

SCORING AND ANALYSIS

The information provided in items 1-3 enables program personnel to use the height/weight charts shown on the next page to determine participants' desirable body weight. Compare desirable body weight (provided in the chart) to actual weight (response to item four).

Estimating Frame Size. Although the weights provided in these weight charts are listed for three different frame sizes, no means of estimating frame size was provided at the time the charts were created. One simple approach is to compare the wristbones of several women and men and then make a subjective judgment regarding their frame size, that is, whether they are small, medium, or large. More specific approaches to estimating frame size (e.g., elbow breadth and wrist circumference) can be found in *Essentials of Nutrition for the Health Professions (Holman, 1987).*

DESIRABLE WEIGHTS FOR WOMEN*

Height (without shoes)		Weight (without clothes)		
Feet	**Inches**	**Small Frame**	**Medium Frame**	**Large Frame**
4	8	88-94	92-103	100-115
4	9	90-97	94-106	102-118
4	10	92-100	97-109	105-121
4	11	95-103	100-112	108-124
5	0	98-106	103-115	111-127
5	1	101-109	106-118	114-130
5	2	104-112	109-122	117-134
5	3	107-115	112-126	121-138
5	4	110-119	116-131	125-142
5	5	114-123	120-135	129-146
5	6	118-127	124-139	133-150
5	7	122-131	128-143	137-154
5	8	126-136	132-147	141-159
5	9	130-140	136-151	145-164
5	10	134-144	140-155	149-169

DESIRABLE WEIGHTS FOR MEN*

Height (without shoes)		Weight (without clothes)		
Feet	**Inches**	**Small Frame**	**Medium Frame**	**Large Frame**
5	1	105-113	111-122	119-134
5	2	108-116	114-126	122-137
5	3	111-119	117-129	125-141
5	4	114-122	120-132	128-145
5	5	117-126	123-136	131-149
5	6	121-130	127-140	135-154
5	7	125-134	131-145	140-159
5	8	129-138	135-149	144-163
5	9	133-143	139-153	148-167
5	10	137-147	143-158	152-172
5	11	141-151	147-163	157-177
6	0	145-155	151-168	161-182
6	1	149-160	155-173	166-187
6	2	153-164	160-178	171-192
6	3	157-168	165-183	175-197

* Weights are appropriate for individuals ages 25 and over. For women 18-25 years, subtract one pound for each year under 25. Source: Adapted from the 1959 Metropolitan Ideal Weight Table.

MAINTAINING DESIRABLE WEIGHT

Please answer the questions below to help figure out your desirable body weight.

1. How old are you?

   _____ years

2. Are you male or female? (Check one)

   _____ male

   _____ female

3. How tall are you (without shoes)?

   _____ feet, _____ inches

4. How much do you weigh in pounds (without clothes)?

   _____ pounds

ACTIVITIES INDEX

This behavior measure assesses participants' general activity level. The measure is appropriate for adults and adolescents. For a more detailed assessment of participants' physical activity, the **Weekly Activities Index** (which can be found in the corresponding Physical Fitness Promotion Handbook) may be used.

PURPOSE

Information regarding participants' physical activity patterns may be helpful for the following reasons:

- If a program includes a weight control component, administration of this measure at the beginning of the program may provide needs assessment information. For example, information from this measure may indicate the need to emphasize the importance of regular physical activity for weight control.
- When this measure is given at the beginning and the end of a program, it is possible to evaluate changes in the frequency, intensity, and/or duration of participants' physical activities.

PROCEDURES

In most cases, this instrument should be administered both at the beginning and end of a program. The measure can be used, however, for needs assessment purposes only as described above.

SCORING AND ANALYSIS

When scoring this measure, each item should be scored separately as described below.

Question One:

Point values should be assigned as follows:

Less Than One Time a Week	=	1
One Time a Week	=	2
Two - Three Times a Week	=	3
Almost Every Day	=	4
Every Day	=	5

Add the point values of all responses for all participants. Then, divide this total by the total number of responses. (Blank items should not be included when counting the total number of responses.) The maximum attainable score of 5 indicates that participants exercise on a daily basis. A score of 1 indicates that participants exercise less than once a week. The average score from before and after the program can be compared to determine changes in participants' exercise behavior. (**Note**: Participants who cannot exercise due to medical restrictions should be excluded from the analysis.)

Question Two:

Calculate the percentage of participants at each activity level (i.e., light, medium, or heavy). Percentages from before and after the program can be compared to determine changes in the intensity of participants' exercise behavior.

Question Three:

Compute the average amount of time participants exercise during each exercise session. The averages from before and after the program can be compared to determine changes in the amount of time (per session) that participants exercise.

Questions Four and Five:

If participants do not (and/or cannot) participate in sports or exercise activities as measured in questions one, two, and three, then program personnel may want to assess household activity before and after the program. To do so, score items four and five in the same manner as items one and three.

ACTIVITIES INDEX

Please answer the following questions about your exercise and household activities as accurately as you can.

1. About how many times a week do you participate in the following sports/exercises? (Check one answer for each activity.)

		Less Than 1 Time a Week	1 Time a Week	2-3 Times a Week	Almost Every Day	Every Day
a.	Aerobic exercising	( )	( )	( )	( )	( )
b.	Bicycling	( )	( )	( )	( )	( )
c.	Bowling	( )	( )	( )	( )	( )
d.	Brisk walking	( )	( )	( )	( )	( )
e.	Calisthenics	( )	( )	( )	( )	( )
f.	Golf	( )	( )	( )	( )	( )
g.	Jogging	( )	( )	( )	( )	( )
h.	Racquetball, Squash	( )	( )	( )	( )	( )
i.	Swimming	( )	( )	( )	( )	( )
j.	Tennis	( )	( )	( )	( )	( )
k.	Other sports/exercises (Please list):					
	_____	( )	( )	( )	( )	( )
	_____	( )	( )	( )	( )	( )
	_____	( )	( )	( )	( )	( )

2. How vigorous, on average, is each of your exercise sessions? (Check one.)

   ( ) Light activity (small increase in breathing rate; very little perspiration)

   ( ) Medium activity (some increase in breathing rate; some perspiration)

   ( ) Heavy activity (large increase in breathing rate; heavy perspiration)

3. How long (in minutes) do you usually exercise during each exercise session?

   _____

4. About how many times a week do you do the following household activities? (Check one answer for each activity.)

	Less Than 1 Time a Week	1 Time a Week	2-3 Times a Week	Almost Every Day	Every Day
a. Gardening (such as weeding, mowing lawn)	( )	( )	( )	( )	( )
b. Digging, Shoveling	( )	( )	( )	( )	( )
c. Housework (such as vacuuming, scrubbing floors)	( )	( )	( )	( )	( )

5. How many minutes (at one time) do you usually spend gardening or doing housework? _____

PROTOCOL FOR CALCULATING WAIST-TO-HIP RATIOS

This protocol describes how to calculate participants' waist-to-hip ratio, which is one measure of participants' risk of heart disease, diabetes, or high blood pressure. This measure is appropriate for adults.

PURPOSE

Information regarding participants' waist-to-hip ratio may be helpful for the following reasons:

- Calculation of individuals' waist-to-hip ratio at the beginning of a program may provide needs assessment information. For example, results may indicate the need to emphasize the link between nutrition and weight control.
- For a program that includes a weight loss component, this ratio can be calculated prior to and following the program in order to evaluate changes in participants' risk levels of certain chronic diseases.

PROCEDURES

The waist-to-hip ratio should be calculated as described in the protocol. Ideally, this ratio should be calculated before and after a program that includes a weight loss component.

SCORING AND ANALYSIS

Calculate individuals' waist-to-hip ratios as described in the protocol. Then, calculate the percentage of males and females above the respective risk levels (1.0 for males and .8 for females). Percentages from before and after a program can be compared to determine changes in participants' risk levels. (Note: Risk levels reflect the point at which increased risk of heart disease, diabetes, or high blood pressure can be demonstrated statistically.)

PROTOCOL FOR CALCULATING WAIST-TO-HIP RATIOS

Calculate individuals' waist-to-hip ratio (see below) as one measure of their risk of heart disease, diabetes, or high blood pressure.

A. Waist-to-Hip Ratio for *Males*:

1. Measure the waist at the navel; record the measurement *in inches.*
2. Measure the hips at the top of the hip bone; record the measurement *in inches.*
3. Divide waist measurement by hip measurement; record the result.
4. Males that have a ratio above 1.0 have an increased risk of heart disease, diabetes, or high blood pressure.

B. Waist-to-Hip Ratio for *Females*:

1. Measure the waist at a point between the bottom of the ribs and the top of the hip bone; record the measurement *in inches.*
2. Measure the hips at the widest point between the hips and the buttocks; record the measurement *in inches.*
3. Divide the waist measurement by the hip measurement; record the result.
4. Females that have a ratio above 0.8 have an increased risk of heart disease, diabetes, or high blood pressure.

CHANGING EATING BEHAVIOR

This behavior measure examines the frequency with which participants use a variety of techniques to avoid overeating. This measure is appropriate for adults.

PURPOSE

Information regarding participants' use of dietary modification techniques may be helpful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results from this measure may indicate the need to (a) broaden participants' array of dietary modification techniques, (b) increase the frequency with which they use such techniques, and/or (c) strengthen participants' beliefs in the value of dietary modification techniques.
- When given at the beginning and end of a program, it is possible to evaluate changes in the frequency with which participants use dietary modification techniques to avoid overeating and the variety of techniques used.

PROCEDURES

In most cases, this measure should be administered both at the beginning and the end of a program. The measure can be used, however, for needs assessment purposes only as described above.

SCORING AND ANALYSIS

The two approaches that can be used to score this measure include examination of (a) the number of dietary modification techniques used and (b) the frequency with which such techniques are used.

Method One: Number of times dietary modification techniques were used

1. For all participants, count the number of items that are marked either **Often** or **Sometimes**. (Ignore any blank or **Never** responses.)
2. Divide this total by the number of program participants. The resulting score will be the average number of dietary modification techniques used by program participants.

   EXAMPLE: Imagine that there are 10 program participants. First, count all the times that these 10 individuals marked either **Often** *or* **Sometimes**. *(Assume that the total number of such responses is 55.) Then, divide 55 by the number of participants. (For this example, this results in an average score of 5.5.)*

Scores can range from 0-30. Low numbers indicate that participants use relatively few techniques to avoid overeating. High numbers indicate participants use numerous dietary modification techniques. Program evaluators should not be overly concerned about group scores that do not extend into the upper end of the possible range of scores as calculated using this method. It seems unlikely that participants would use all the strategies included on this measure. Rather, individual participants may find several strategies that work well for them.

Method Two: Frequency with which techniques are used

1. For all participants, count only the items that are marked **Often**.
2. Divide this total by the number of times items were marked **Often** or **Sometimes** (as computed for method one above). Multiply this number by 100 to obtain the percentage of techniques that participants used **Often**.
3. To determine the percentage of techniques used **Sometimes**, subtract the **Often** percentage from 100.

EXAMPLE: For the same 10 individuals used in the example above, count the number of times they marked **Often.** *(Assume the total is 35.) Then, divide by the total number of times the 10 individuals marked either* **Often** *or* **Sometimes.** *(This number was already determined to be 55 in the previous example.) Divide 35 by 55 to determine what percentage of the techniques used are used often. In this case, 35/55 is about 64%. Thus, of the techniques used, 64% are used often, and 36% are used sometimes.*

CHANGING EATING BEHAVIOR

Listed below are ways that some people use to avoid overeating. How often do you do each of the following things to change your eating habits? Check one answer for each activity.

	Often	Sometimes	Never/ Almost Never
1. Plan meals in advance	( )	( )	( )
2. Drink a large glass of water before eating	( )	( )	( )
3. Eat smaller portions	( )	( )	( )
4. Serve and eat one portion at a time	( )	( )	( )
5. Eat more slowly	( )	( )	( )
6. Put your fork down between bites	( )	( )	( )
7. Stop eating before feeling full	( )	( )	( )
8. Eat several small meals throughout the day	( )	( )	( )
9. Avoid skipping meals	( )	( )	( )
10. Leave the table after eating	( )	( )	( )
11. Avoid eating after a certain time in the evening (such as after 8:00 p.m.)	( )	( )	( )
12. Avoid eating while doing something else (such as watching T.V. or driving)	( )	( )	( )
13. Eat in one location (such as at the kitchen table)	( )	( )	( )
14. Keep snack foods out of sight	( )	( )	( )
15. Leave the house or kitchen to avoid eating	( )	( )	( )
16. Shop from a list	( )	( )	( )

	Often	Sometimes	Never/ Almost Never
17. Shop on a full stomach	( )	( )	( )
18. Tell someone about your dietary goals	( )	( )	( )
19. Imagine being thinner	( )	( )	( )
20. Call a friend to avoid snacking	( )	( )	( )
21. Set realistic weight-loss goals	( )	( )	( )
22. Keep a food diary	( )	( )	( )
23. Weigh yourself periodically	( )	( )	( )
24. Exercise	( )	( )	( )
25. Keep busy (for example, get involved in a craft or hobby)	( )	( )	( )
26. Promise yourself a non-food reward, such as new clothes, for sticking to a new eating pattern	( )	( )	( )
27. Chew gum	( )	( )	( )
28. Substitute fresh fruit for sweet desserts	( )	( )	( )
29. Avoid desserts	( )	( )	( )
30. Avoid alcoholic beverages	( )	( )	( )

(___ Check here if you do not drink.)

HEALTH HABITS AND HISTORY QUESTIONNAIRE

GENERAL DESCRIPTION

The **Health Habits and History Questionnaire (HHHQ)**, developed under the direction of Dr. Gladys Block of the National Cancer Institute, is a behavior measure designed to assess the typical eating patterns of adults. The questionnaire covers most of the well-established risk factors for cancer or total mortality and includes a major dietary assessment component. For the dietary assessment portion, respondents are asked to indicate usual eating patterns as well as usual serving sizes (with respect to a stated medium serving). Questions on restaurant foods, frequency and type of fat added in cooking or at the table, and the consumption of the skin on chicken or the fat on meat are also included.

The instrument, developed primarily for epidemiologic and clinical use, is capable of assessing specific nutrients as well as foods and food groups. For example, usual daily intake of approximately 25 nutrients can be calculated, including (but not limited to) carbohydrates, dietary fiber, fats, protein, and various vitamins and minerals.

ADMINISTRATION

The questionnaire can be (a) self-administered, (b) interview-administered, or (c) computer-administered. The full questionnaire (which includes both diet and non-diet sections) takes approximately 35-40 minutes to self-administer. A shortened version, which correlates highly (from .90 to .98 for various nutrients) with the long version, is available and requires less than 17 minutes to self-administer.

SCORING AND ANALYSIS

Data analysis requires a personal computer or mainframe program. Documentation, including code books, editing tools, as well as data management and analysis suggestions, is available for the dietary analysis system.

AVAILABILITY

To obtain the questionnaire as well as the user documentation contact:

Dr. Gladys Block
National Cancer Institute
Division of Cancer Prevention and Control
Blair Building, Room 515
9000 Rockville Pike
Bethesda, MD 20892-4200
(301) 427-8837

Inquiries regarding the design or analysis of the HHHQ should also be directed to Dr. Block.

FOODS AND THE DIETARY GUIDELINES
(FORMS A & B)

This knowledge measure assesses what participants know about the *Dietary Guidelines*, including selecting foods based on the *Dietary Guidelines*. This measure also assesses participants' knowledge of the relationship between eating patterns and health risks. The measure is appropriate for adults.

PURPOSE

Information regarding participants' knowledge of the *Dietary Guidelines for Americans*, published by the U.S. Departments of Agriculture and Health and Human Services, may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 20 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	T	T
2	T	T
3	F	T
4	T	F
5	F	F
6	F	F
7	T	T
8	F	F
9	F	F
10	F	F
11	T	T
12	T	F
13	F	T
14	F	T
15	T	F
16	T	F
17	T	F
18	F	T
19	T	T
20	F	T

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

FOODS AND THE DIETARY GUIDELINES

Form A

This test consists of 20 statements about eating patterns based on the Dietary Guidelines. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. One way for people to increase the amount of fiber in their diets is to eat more fruit.
( )	( )	( )	2. Cooking chicken without the skin reduces its fat content.
( )	( )	( )	3. Flavorings such as soy sauce, mustard, or garlic salt are good low-sodium substitutes for table salt.
( )	( )	( )	4. Most cheeses are high in salt.
( )	( )	( )	5. Hot dogs are a good source of protein.
( )	( )	( )	6. Broiled foods have more fat than fried foods.
( )	( )	( )	7. A breaded pork chop has more fat than a broiled pork chop.
( )	( )	( )	8. Chicken nuggets are much lower in fat than a hamburger.
( )	( )	( )	9. Foods that are low in cholesterol are naturally low in fat.
( )	( )	( )	10. Butter and margarine have about the same amount of cholesterol.
( )	( )	( )	11. Pizza is high in fat.
( )	( )	( )	12. Dry cooked beans are a good source of fiber.
( )	( )	( )	13. Expensive brands of ice cream usually have less fat than the cheaper brands.

True	False	Don't Know	
( )	( )	( )	14. Most people should eat fewer starchy foods, such as bread and potatoes.
( )	( )	( )	15. Eating a lot of salt may increase a person's chance of getting high blood pressure.
( )	( )	( )	16. Eating starchy foods, such as crackers, between meals increases a person's chance of getting tooth decay.
( )	( )	( )	17. Drinking a lot of alcohol interferes with the body's ability to use vitamins and minerals.
( )	( )	( )	18. Being overweight does not affect a person's chance of getting coronary heart disease.
( )	( )	( )	19. Diets that are very low in calories can cause serious health problems.
( )	( )	( )	20. Most people should take a multivitamin every day.

FOODS AND THE DIETARY GUIDELINES

Form B

This test consists of 20 statements about selecting and preparing foods based on the Dietary Guidelines. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Eating more whole-grain foods, such as oatmeal or whole wheat bread, adds fiber to the diet.
( )	( )	( )	2. One way people can cut the amount of saturated fat in their diets is to use margarine instead of butter.
( )	( )	( )	3. Most canned soups are high in sodium.
( )	( )	( )	4. A person can tell how much sodium a food has by tasting it.
( )	( )	( )	5. Peanut butter is an excellent low-fat source of protein.
( )	( )	( )	6. Most luncheon meats are low in sodium.
( )	( )	( )	7. Baked chicken has less fat than fried chicken.
( )	( )	( )	8. Starchy foods, such as pasta and potatoes, are high in fat.
( )	( )	( )	9. Honey has fewer calories than table sugar.
( )	( )	( )	10. All cheeses have about the same amount of fat.
( )	( )	( )	11. One way to reduce fat in the diet is to substitute skim milk for whole milk.
( )	( )	( )	12. A green salad with creamy French dressing is a good low-fat substitute for a turkey sandwich with mayonnaise.
( )	( )	( )	13. One way to reduce cholesterol in the diet is to eat more plant foods and less animal foods.

True	False	Don't Know	
( )	( )	( )	14. Gourmet ice cream has about four times more fat than frozen yogurt.
( )	( )	( )	15. Fruit drinks, such as Hi-C and punch, are good low-sugar substitutes for regular soft drinks.
( )	( )	( )	16. Milk products, such as cheese and yogurt, are high in fiber.
( )	( )	( )	17. Apple juice has the same amount of fiber as a whole apple.
( )	( )	( )	18. Drinking alcohol adds calories to the diet.
( )	( )	( )	19. Being overweight increases a person's chance of developing high blood pressure.
( )	( )	( )	20. A diet high in fiber may help prevent certain chronic diseases, such as colon cancer.

SELECTING FOODS FOR YOUR HEALTH
(FORMS A & B)

This knowledge measure assesses what participants know about the *Dietary Guidelines*, including selecting foods based on the *Dietary Guidelines*. This measure also assesses participants' knowledge of the relationship between eating patterns and health risks. The measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' knowledge of the *Dietary Guidelines for Americans*, published by the U.S. Departments of Agriculture and Health and Human Services, may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	F	T
2	F	F
3	T	F
4	F	T
5	T	F
6	F	F
7	T	F
8	F	T
9	F	F
10	F	F
11	T	T
12	T	T
13	T	T
14	F	F
15	T	T

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

SELECTING FOODS FOR YOUR HEALTH

Form A

This test contains 15 statements about eating patterns based on the Dietary Guidelines. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Chicken eaten without its skin has the same amount of fat as chicken eaten with its skin.
( )	( )	( )	2. Broiled foods have more fat than fried foods.
( )	( )	( )	3. Most processed breakfast cereals, such as corn flakes, contain a lot of sodium.
( )	( )	( )	4. White bread has about the same amount of fiber as rye bread.
( )	( )	( )	5. Drinking skim milk instead of whole milk is a good way to lower fat in the diet.
( )	( )	( )	6. Honey has fewer calories than sugar.
( )	( )	( )	7. Pizza is high in fat.
( )	( )	( )	8. Apple juice has the same amount of fiber as a whole apple.
( )	( )	( )	9. Starchy foods, such as pasta and bread, are high in fat.
( )	( )	( )	10. Chicken nuggets are much lower in fat than a hamburger.
( )	( )	( )	11. Most canned soups are high in sodium.
( )	( )	( )	12. Eating a lot of salt may raise a person's chance of getting high blood pressure.
( )	( )	( )	13. Eating starchy foods, such as crackers or bread, between meals raises a person's chance of getting cavities.
( )	( )	( )	14. Most people get too much fiber in their diets.
( )	( )	( )	15. Most people get too much salt in their diets.

SELECTING FOODS FOR YOUR HEALTH

Form B

This test contains 15 statements about eating patterns based on the Dietary Guidelines. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Eating whole-grain foods, such as oatmeal or whole wheat bread, adds fiber to the diet.
( )	( )	( )	2. Ice cream and frozen yogurt have about the same amount of fat.
( )	( )	( )	3. Most fruit drinks, such as Hi-C and punch, are low in sugar.
( )	( )	( )	4. One way people can lower the amount of saturated fat in their diets is to use margarine instead of butter.
( )	( )	( )	5. Baked chicken has more fat than fried chicken.
( )	( )	( )	6. Fruit juices are a good source of fiber.
( )	( )	( )	7. Foods that are low in cholesterol are also low in fat.
( )	( )	( )	8. Starchy foods, such as bread and pasta, are low in fat.
( )	( )	( )	9. Milk products, such as cheese and yogurt, are high in fiber.
( )	( )	( )	10. Fish sticks are low in fat.
( )	( )	( )	11. One way to reduce cholesterol in the diet is to eat fewer animal foods and more plant foods.
( )	( )	( )	12. Eating foods that are high in saturated fat raises a person's chance of getting coronary heart disease.
( )	( )	( )	13. Being overweight raises a person's chance of getting high blood pressure.
( )	( )	( )	14. Most people should take a multivitamin every day.
( )	( )	( )	15. A diet high in fiber lowers a person's chance of getting colon cancer.

NUTRITION AND THE LIFE CYCLE
(FORMS A & B)

This knowledge measure assesses what participants know about nutritional needs during particular stages of the life cycle, for example, early childhood, adolescence, and pregnancy. The measure is appropriate for adults and older adolescents.

PURPOSE

Information regarding participants' knowledge of the nutritional needs during various stages of life may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods:

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 20 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	T	F
2	F	T
3	F	T
4	F	F
5	T	F
6	F	T
7	T	F
8	T	T
9	F	T
10	T	F
11	F	T
12	F	F
13	T	F
14	T	T
15	T	T
16	F	T
17	T	F
18	T	F
19	F	T
20	F	F

The measure should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

NUTRITION AND THE LIFE CYCLE

Form A

This test consists of 20 statements about nutrition and the life cycle. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Women over 21 years old who are pregnant need at least three servings of milk or milk products each day.
( )	( )	( )	2. Women who are pregnant need about the same amount of protein as women who are not pregnant.
( )	( )	( )	3. A woman who is overweight before becoming pregnant should try to lose weight during her pregnancy.
( )	( )	( )	4. It is safe to give cow's milk to a four-month old baby.
( )	( )	( )	5. Babies do not need solid food until they are four to six months old.
( )	( )	( )	6. School-age children need twice as many calories as adults.
( )	( )	( )	7. Most adults should eat at least four to six servings of bread, cereal, or other starchy foods each day.
( )	( )	( )	8. Most pregnant women need to gain more than 15 pounds during pregnancy.
( )	( )	( )	9. School-age children and teenagers need more servings of meat or protein foods than adults.
( )	( )	( )	10. Infants and children ages six months to three years old need more iron than older children.
( )	( )	( )	11. Preschool children need to drink a quart of milk each day.
( )	( )	( )	12. Teenage boys and girls need about the same amount of calories during their growth periods.

True	False	Don't Know	
( )	( )	( )	13. Teenage girls who menstruate need more iron than teenage girls who have not started menstruating.
( )	( )	( )	14. Many teenage girls do not get enough minerals, such as calcium.
( )	( )	( )	15. Teenagers who go on crash diets may adversely affect their health.
( )	( )	( )	16. Teenage athletes should get twice as much protein as nonathletes.
( )	( )	( )	17. Most older adults need fewer calories than younger adults.
( )	( )	( )	18. Many older adults do not get enough dietary fiber.
( )	( )	( )	19. Older adults should have no more than one serving of milk products each day.
( )	( )	( )	20. Most people should eat at least four servings of meat or protein foods each day.

NUTRITION AND THE LIFE CYCLE

Form B

This test consists of 20 statements about nutrition and the life cycle. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. A woman who is pregnant needs to eat about 1000 extra calories a day during her pregnancy.
( )	( )	( )	2. Pregnant women need more iron than women who are not pregnant.
( )	( )	( )	3. Pregnant or nursing teenagers need at least four servings of milk products each day.
( )	( )	( )	4. Research shows that heavy alcohol use during pregnancy has no affect on an unborn child.
( )	( )	( )	5. Current medical practice suggests that babies as young as two months old should be fed solid foods.
( )	( )	( )	6. Most adults should eat at least two to three servings of meat or protein foods each day.
( )	( )	( )	7. Babies should be given low-fat (2%) milk instead of whole milk after the age of six months.
( )	( )	( )	8. Children under 10 years old should get at least two servings of milk products each day.
( )	( )	( )	9. Healthy children adjust their eating to meet their energy needs.
( )	( )	( )	10. Serving sizes for preschool children are about the same as those for adults.
( )	( )	( )	11. Most people should eat at least four to five servings of fruit and vegetables each day.
( )	( )	( )	12. A baby's appetite usually increases during the second year of life.

True	False	Don't Know	
( )	( )	( )	13. Most school-age children should take vitamins to make up for their picky eating patterns.
( )	( )	( )	14. Teenagers need more calcium than younger children.
( )	( )	( )	15. Teenagers need at least three servings of milk products each day.
( )	( )	( )	16. Teenage boys need more iron than usual during their growth period.
( )	( )	( )	17. Adult women need more iron after menopause than during the childbearing years.
( )	( )	( )	18. Older adults need about the same amount of calories as younger adults.
( )	( )	( )	19. Diets of older adults, especially women, are often low in calcium.
( )	( )	( )	20. Most older adults need less protein than younger adults.

FACTS ABOUT VITAMIN AND MINERAL SUPPLEMENTS
(FORMS A & B)

This knowledge measure assesses what participants know about the appropriate and inappropriate uses of vitamin and mineral supplements. The measure is appropriate for adults.

PURPOSE

Information regarding participants' knowledge of the use of nutrient supplements may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	F	T
2	T	F
3	F	T
4	F	T
5	T	F
6	T	T
7	F	F
8	T	F
9	T	T
10	T	T
11	F	F
12	F	F
13	T	F
14	F	F
15	F	T

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

FACTS ABOUT VITAMIN AND MINERAL SUPPLEMENTS

Form A

This test consists of 15 statements about the use of vitamin and mineral supplements. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. The best way for individuals to get enough vitamins is to take vitamin pills.
( )	( )	( )	2. Women with heavy menstrual bleeding may need to take iron supplements.
( )	( )	( )	3. People who do not eat red meat, such as beef, need to take vitamins.
( )	( )	( )	4. People who follow healthful diets can improve their health by taking vitamin supplements.
( )	( )	( )	5. Most Americans can get the vitamins and minerals they need from the food they eat.
( )	( )	( )	6. Vitamin and mineral supplements are often sold in doses much higher than the recommended amounts.
( )	( )	( )	7. Research shows that taking large doses of vitamin C prevents colds.
( )	( )	( )	8. Taking high doses of one mineral, such as calcium, affects the body's need for other minerals, such as iron.
( )	( )	( )	9. Some vitamins and minerals can be harmful when taken in large doses.
( )	( )	( )	10. People who are recovering from surgery or an illness may need to take vitamin or mineral supplements.
( )	( )	( )	11. Research shows that taking B vitamins prevents premenstrual syndrome.

True	False	Don't Know	
( )	( )	( )	12. Calcium supplements are necessary to prevent osteoporosis (thinning of the bones).
( )	( )	( )	13. It is safer to take a multivitamin than it is to take individual vitamins, such as vitamin A or C.
( )	( )	( )	14. Taking vitamins increases a person's energy level.
( )	( )	( )	15. Competitive athletes need twice as many vitamins as nonathletes to meet the demands of strenuous exercise.

FACTS ABOUT VITAMIN AND MINERAL SUPPLEMENTS

Form B

This test consists of 15 statements about the use of vitamin and mineral supplements. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Most pregnant women need to take vitamin and mineral supplements.
( )	( )	( )	2. People who exercise regularly need to take vitamins.
( )	( )	( )	3. Taking high doses of certain vitamins and minerals can change the effectiveness of some medications.
( )	( )	( )	4. Older, inactive people are more likely to need vitamin and mineral supplements than are young adults.
( )	( )	( )	5. Research shows that taking fish oil supplements prevents coronary heart disease.
( )	( )	( )	6. Research shows that taking large doses of vitamin C will not prevent colds.
( )	( )	( )	7. Taking vitamins gives people more energy.
( )	( )	( )	8. People who are under stress at work or at home need to take "stress" vitamins.
( )	( )	( )	9. Taking a lot of vitamin and mineral supplements can be harmful to the body.
( )	( )	( )	10. The best way to get needed vitamins and minerals is to eat a variety of foods.
( )	( )	( )	11. Taking high doses of one mineral, such as calcium, does not affect the body's need for other minerals, such as iron.
( )	( )	( )	12. Natural vitamins are better for the body than artificial vitamins.

True	False	Don't Know	
( )	( )	( )	13. Research shows that taking large doses of vitamins A and C prevents cancer.
( )	( )	( )	14. Taking vitamins will make up for eating "junk food."
( )	( )	( )	15. For healthy people, there are no known advantages of taking vitamins in excess of the Recommended Dietary Allowances (RDA).

FACTS ABOUT TAKING VITAMINS AND MINERALS
(FORMS A & B)

This knowledge measure assesses what participants know about the appropriate and inappropriate uses of vitamin and mineral supplements. The measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' knowledge of the use of nutrient supplements may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 10 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	F	T
2	F	F
3	T	F
4	T	T
5	F	T
6	T	T
7	T	F
8	T	F
9	F	F
10	F	T

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

FACTS ABOUT TAKING VITAMINS AND MINERALS

Form A

This test contains 10 statements about taking vitamins and minerals. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. The best way for people to get enough vitamins is to take vitamin pills.
( )	( )	( )	2. People who do not eat red meat, such as beef, need to take vitamins.
( )	( )	( )	3. Some vitamins can be harmful when taken in large doses.
( )	( )	( )	4. People who are recovering from surgery or an illness may need to take vitamins or minerals.
( )	( )	( )	5. People who follow healthful diets can improve their health by taking vitamin pills.
( )	( )	( )	6. Most people can get the vitamins and minerals they need from the food they eat.
( )	( )	( )	7. Taking high doses of one mineral, such as calcium, affects the body's need for other minerals, such as iron.
( )	( )	( )	8. It is safer to take a multivitamin than to take several single vitamins, such as vitamins A and C.
( )	( )	( )	9. Most competitive athletes need twice as many vitamins as people who are not athletes.
( )	( )	( )	10. Natural vitamin pills are better for the body than artificial vitamin pills.

FACTS ABOUT TAKING VITAMINS AND MINERALS

Form B

This test contains 10 statements about taking vitamins and minerals. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Taking too many vitamins or minerals can be harmful to the body.
( )	( )	( )	2. People who exercise regularly need to take vitamins.
( )	( )	( )	3. Research shows that taking fish oil pills prevents coronary heart disease.
( )	( )	( )	4. Most people do not need to take vitamins if they eat healthful foods.
( )	( )	( )	5. Taking vitamins will not give people more energy.
( )	( )	( )	6. The best way to get needed vitamins and minerals is to eat a variety of foods.
( )	( )	( )	7. People who are under stress at school or at home need to take "stress" vitamins.
( )	( )	( )	8. Research shows that taking large doses of vitamin C prevents colds.
( )	( )	( )	9. Taking vitamins will make up for eating "junk food."
( )	( )	( )	10. Current research shows that taking vitamins will not prevent cancer.

SAFETY IN FOOD PREPARATION
(FORMS A & B)

This knowledge measure assesses what participants know about food preparation and handling practices related to illness, such as salmonella. The measure is appropriate for adults.

PURPOSE

Information regarding participants' knowledge of safe food handling techniques may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	T	T
2	F	F
3	T	T
4	T	F
5	F	T
6	F	T
7	T	T
8	F	F
9	T	T
10	F	F
11	F	F
12	T	F
13	T	T
14	F	T
15	T	F

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

SAFETY IN FOOD PREPARATION

Form A

This test consists of 15 statements on food-related illness and food preparation. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Rinsing poultry with cold water before cooking it washes away some of the harmful bacteria that may be present.
( )	( )	( )	2. Meats that have been frozen can be thawed safely at room temperature.
( )	( )	( )	3. Pork should be cooked until it is gray or white in color.
( )	( )	( )	4. Food can become contaminated by people who do not wash their hands after using the bathroom.
( )	( )	( )	5. A big batch of hot food, such as stew, should be put in a large container to cool.
( )	( )	( )	6. Poultry contaminated with bacteria almost always has a strong odor.
( )	( )	( )	7. Raw chicken can be kept safely in a refrigerator for two to three days.
( )	( )	( )	8. Only foods that smell or taste bad can make people sick.
( )	( )	( )	9. Raw or unpasteurized milk is more likely to be contaminated with bacteria than pasteurized milk.
( )	( )	( )	10. Adding lemon juice or vinegar to meat-marinades stops bacteria from growing.
( )	( )	( )	11. Leftovers, such as casseroles, should be covered and cooled completely before being refrigerated.

True	False	Don't Know	
( )	( )	( )	12. Dish rags and sponges can easily become contaminated with bacteria.
( )	( )	( )	13. The best way to kill bacteria on counter surfaces or cutting boards is to use a weak bleach-water solution.
( )	( )	( )	14. Meat that is rare is just as safe to eat as meat that is well-done.
( )	( )	( )	15. It is safe to refreeze meat that has been thawed overnight in a refrigerator.

SAFETY IN FOOD PREPARATION

Form B

This test consists of 15 statements on food-related illness and food preparation. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Poultry should be cooked until the juices are yellow or clear to kill any bacteria that may be present.
( )	( )	( )	2. Hamburger meat can be eaten raw without risk of illness.
( )	( )	( )	3. It is risky to marinate meats at room temperature for several hours.
( )	( )	( )	4. Food poisoning is difficult to prevent.
( )	( )	( )	5. The bacteria sometimes found in raw poultry can contaminate the utensils, such as knives, used in preparing the poultry.
( )	( )	( )	6. Refrigerated foods should be kept at temperatures of 40°F or below.
( )	( )	( )	7. Poultry contaminated with bacteria does not look any different than uncontaminated poultry.
( )	( )	( )	8. It is safe to leave stuffing inside a turkey after the turkey and stuffing have been cooked.
( )	( )	( )	9. Wooden cutting boards are more likely to become contaminated with bacteria than plastic ones.
( )	( )	( )	10. Steaming clams for one minute will kill any illness-causing organisms that may be present in the clams.
( )	( )	( )	11. Keeping foods on a stove at low temperatures will keep bacteria from growing.

True	False	Don't Know	
( )	( )	( )	12. Poultry contaminated with bacteria almost always has a bad taste.
( )	( )	( )	13. A cracked jar could be a sign of contaminated food.
( )	( )	( )	14. Only some of the germs that spoil food can make people sick.
( )	( )	( )	15. Raw ground beef can be kept safely in a refrigerator for up to one week.

PREPARING FOODS SAFELY
(FORMS A & B)

This knowledge measure assesses what participants know about food preparation and handling practices related to illness, such as salmonella. The measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' knowledge of safe food handling techniques may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	T	T
2	F	F
3	F	F
4	T	T
5	F	F
6	T	T
7	T	T
8	T	F
9	T	F
10	F	T
11	F	T
12	F	T
13	T	F
14	F	T
15	F	F

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

PREPARING FOODS SAFELY

Form A

This test contains 15 statements on preparing foods safely. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Rinsing chicken with cold water before cooking it washes away some of the harmful bacteria that may be present.
( )	( )	( )	2. Meats that have been frozen can be thawed safely on a kitchen counter.
( )	( )	( )	3. Raw hamburger can be kept safely in a refrigerator for a week.
( )	( )	( )	4. Food can become contaminated by people who do not wash their hands after using the bathroom.
( )	( )	( )	5. A big batch of hot food, such as spaghetti sauce, should be put in a large container and cooled slowly.
( )	( )	( )	6. Bacteria that cause food poisoning can live on objects, such as knives or cutting boards.
( )	( )	( )	7. Chicken contaminated with bacteria does not always have a strong smell.
( )	( )	( )	8. Pork should be cooked until it is gray or white in color.
( )	( )	( )	9. Raw or unpasteurized milk is more likely to be contaminated with bacteria than pasteurized milk.
( )	( )	( )	10. Chicken contaminated with bacteria almost always has a bad taste.
( )	( )	( )	11. Leftovers, such as casseroles, should be covered and cooled completely before they are refrigerated.
( )	( )	( )	12. Meat that is rare is just as safe to eat as meat that is well-done.

True	False	Don't Know	
( )	( )	( )	13. An opened jar of mayonnaise can be stored safely in a refrigerator for up to a year.
( )	( )	( )	14. Raw hamburger meat that has a bad smell is safe to eat.
( )	( )	( )	15. Only foods that smell or taste bad can make people sick.

PREPARING FOODS SAFELY

Form B

This test contains 15 statements on preparing foods safely. Put a check to show whether you think each statement is TRUE or FALSE. If you don't know whether a statement is true or false, put a check under DON'T KNOW.

True	False	Don't Know	
( )	( )	( )	1. Chicken should be cooked until the juices are yellow or clear to kill any bacteria that may be present.
( )	( )	( )	2. Leftovers, such as casseroles, should be covered and cooled before they are refrigerated.
( )	( )	( )	3. It is safe to eat raw hamburger meat.
( )	( )	( )	4. A cracked jar could be a sign of spoiled food.
( )	( )	( )	5. The black, crusty ring around the rim of a jar of mustard or catsup means that the food is spoiled.
( )	( )	( )	6. The bacteria sometimes found in raw meat can get on the utensils, such as knives, used in fixing the meat.
( )	( )	( )	7. Chicken contaminated with bacteria does not look any different than uncontaminated chicken.
( )	( )	( )	8. Keeping foods warm on a stove will keep bacteria from growing.
( )	( )	( )	9. Raw chicken can be refrigerated safely for up to a week.
( )	( )	( )	10. Chicken contaminated with bacteria almost never has a bad smell.
( )	( )	( )	11. Wooden cutting boards are more likely to become contaminated with bacteria than plastic ones.
( )	( )	( )	12. Only some of the germs that spoil food can make people sick.

True	False	Don't Know	
( )	( )	( )	13. Raw hamburger meat that has turned brown after being in a refrigerator for a day is spoiled.
( )	( )	( )	14. It is safe to refreeze meat that has been unfrozen overnight in a refrigerator.
( )	( )	( )	15. Food poisoning cannot be prevented.

EARTH FRIENDS
(FORMS A & B)

This knowledge measure assesses what participants know about nutrition-related earth conservation actions. This measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' knowledge of nutrition-related earth conservation actions may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' knowledge prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior knowledge of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' knowledge.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 10 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will be sensitized to the specific facts to be learned from the program.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below. For each item, answers in the first position are coded as "A" below. Answers in the second position are coded as "B."

Item No.	Form A	Form B
1	B	A
2	A	A
3	A	B
4	A	A
5	B	B
6	B	B
7	A	A
8	A	B
9	B	A
10	B	B

The measures should be scored by counting the number of answers correct for each participant. Items left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' knowledge.

EARTH FRIENDS

Form A

This test is about being an earth friend. An earth friend tries to save the earth's natural resources by choosing foods that need the minimum amount of energy to be produced, packaged, and transported.

For each pair of actions below, put a check next to the one that is most earth friendly.

1. ( ) buying foods that are grown in another country
   ( ) buying foods that are grown in the United States

2. ( ) buying juice packaged in a large bottle
   ( ) buying juice packaged in six small cans

3. ( ) choosing an apple for a snack
   ( ) choosing an apple roll-up for a snack

4. ( ) buying fresh fruits and vegetables only when they are in season
   ( ) buying fresh fruits and vegetables even when they are not in season

5. ( ) choosing an orange-flavored drink for breakfast
   ( ) choosing an orange for breakfast

6. ( ) buying cereal packaged in individual boxes
   ( ) buying cereal packaged in a large box

For each pair of actions below, put a check next to the one that is most earth friendly.

7. ( ) fixing baked potatoes for dinner
   ( ) fixing instant mashed potatoes for dinner

8. ( ) buying locally grown vegetables
   ( ) buying vegetables grown in distant states

9. ( ) choosing cheese that is sliced and individually wrapped
   ( ) choosing cheese that comes in a block

10. ( ) using luncheon meats, such as bologna, for sandwiches
    ( ) using fresh cooked meats, such as chicken, for sandwiches

EARTH FRIENDS

Form B

This test is about being an earth friend. An earth friend tries to save the earth's natural resources by choosing foods that need the minimum amount of energy to be produced, packaged, and transported.

For each pair of actions below, put a check next to the one that is most earth friendly.

1. ( ) buying raisins packaged in a large box
   ( ) buying raisins packaged in individual boxes

2. ( ) choosing peanuts for a snack
   ( ) choosing a peanut butter granola bar for a snack

3. ( ) buying vegetables grown in distant states
   ( ) buying vegetables grown locally or in nearby states

4. ( ) choosing fresh fruit that is in season
   ( ) choosing canned fruit

5. ( ) buying soda packaged in six cans
   ( ) buying soda packaged in a large bottle

6. ( ) choosing grape-flavored drink for a snack
   ( ) choosing grape juice for a snack

7. ( ) growing your own vegetables, such as tomatoes
   ( ) buying vegetables, such as tomatoes, from a market

For each pair of actions below, put a check next to the one that is most earth friendly.

8. ( ) buying cheese spread
   ( ) buying cheese that comes in a block

9. ( ) buying foods that are grown in the United States
   ( ) buying foods that are grown in another country

10. ( ) buying fresh fruit even when it is not in season
    ( ) buying fresh fruit only when it is in season

DIET PLAN ANALYSIS
(FORMS A & B)

This skill measure assesses participants' ability to categorize a variety of foods into food groups, such as meat or grain, and nutrient groups, such as high-fat or high-fiber. The measure is appropriate for adults and older adolescents.

PURPOSE

Information regarding participants' ability to classify various foods appropriately may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' skill prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior skill of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' skill.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will remember how they answered each item on the pretest.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	C	C
2	B	B
3	A	B
4	A	A
5	C	C
6	C	B
7	C	B
8	B	C
9	B	A
10	A	A
11	B	B
12	A	C
13	B	C
14	A	B
15	C	A

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't Know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' skill.

DIET PLAN ANALYSIS

Form A

Greg Sparks recorded the foods he ate for a usual day. Read the list of foods below, then answer questions 1-5. Circle one answer for each question. If you don't know the answer to a question, circle choice D, DON'T KNOW.

BREAKFAST
orange juice
corn flakes with whole milk and banana

LUNCH
Roast beef sandwich with mayonnaise
and tomatoes on whole wheat bread
apple
soda

SNACK
crackers and peanut butter

DINNER
spaghetti with tomato sauce
bean salad
French bread
whole milk

1. How many foods from the grain and cereal group did Greg eat?
   A. 3 foods
   B. 4 foods
   C. 5 foods
   D. Don't know

2. How many foods from the fruit group did Greg eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

3. How many foods from the milk products group did Greg eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

4. How many high-protein foods did Greg eat?
   A. 5 foods
   B. 6 foods
   C. 7 foods
   D. Don't know

5. How many high-fat foods did Greg eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

Jackie Scott recorded the foods she ate for a usual day. Read the list of foods below, then answer questions 6-10.

BREAKFAST
whole wheat toast with peanut butter
apple
non-fat milk

LUNCH
ham sandwich with mustard on rye bread
carrot sticks
pineapple juice

DINNER
canned tomato soup
macaroni and cheese
plain green peas
non-fat milk

6. How many foods from the fruit group did Jackie eat?
   A. 0 foods
   B. 1 food
   C. 2 foods
   D. Don't know

7. How many foods from the meat group did Jackie eat?
   A. 0 foods
   B. 1 food
   C. 2 foods
   D. Don't know

8. How many foods from the milk products group did Jackie eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

9. How many high-fiber foods did Jackie eat?
   A. 4 foods
   B. 5 foods
   C. 6 foods
   D. Don't know

10. Jackie does not *add* salt to her foods. How many high-sodium foods did Jackie eat?
   A. 3 foods
   B. 4 foods
   C. 5 foods
   D. Don't know

Paul Davis recorded the foods he ate for a usual day. Read the list of foods below, then answer questions 11-15.

BREAKFAST
orange juice
doughnut

SNACK
chocolate bar

LUNCH
cheese sandwich with mayonnaise
on white bread
potato chips
non-fat milk

DINNER
cheeseburger
French fries
regular soda

11. How many foods from the fruit group did Paul eat?
    A. 0 foods
    B. 1 food
    C. 2 foods
    D. Don't know

12. How many foods from the milk products group did Paul eat?
    A. 3 foods
    B. 4 foods
    C. 5 foods
    D. Don't know

13. How many foods from the meat group did Paul eat?
    A. 0 foods
    B. 1 food
    C. 2 foods
    D. Don't know

14. How many high-fiber foods did Paul eat?
    A. 0 foods
    B. 1 food
    C. 2 foods
    D. Don't know

15. Based on the foods Paul usually eats, which of the following is true of his eating patterns?
    A. It seems that Paul gets too much sugar.
    B. It seems that Paul gets too much starch.
    C. It seems that Paul gets too much fat.
    D. Don't know

DIET PLAN ANALYSIS

Form B

Daryl Jones recorded the foods he ate for a usual day. Read the list of foods below, then answer questions 1-5. Circle one answer for each question. If you don't know the answer to a question, circle choice D, DON'T KNOW.

BREAKFAST
sweet roll
apple juice

LUNCH
cheese pizza
soda

SNACK
raisins

DINNER
baked fish
boiled potatoes
broccoli
whole milk
pecan pie

1. How many foods from the fruit group did Daryl eat?
   A. 0 foods
   B. 1 food
   C. 2 foods
   D. Don't know

2. How many foods from the milk products group did Daryl eat?
   A. 1 food
   B. 2 foods
   C. 3 foods
   D. Don't know

3. How many foods from the meat group did Daryl eat?
   A. 0 foods
   B. 1 food
   C. 2 foods
   D. Don't know

4. How many high-fat foods did Daryl eat?
   A. 4 foods
   B. 5 foods
   C. 6 foods
   D. Don't know

5. How many high-fiber foods did Daryl eat?
   A. 1 food
   B. 2 foods
   C. 3 foods
   D. Don't know

Krista Fox recorded the foods she ate for a usual day. Read the list of foods below, then answer questions 6-10.

BREAKFAST
orange juice
sourdough English muffin with
margarine and honey
fried egg
low-fat milk

SNACK
plain yogurt

LUNCH
bologna and cheese sandwich
corn chips
low-fat milk

SNACK
regular soda

DINNER
baked chicken
green beans
whole wheat roll with margarine
low-fat milk

6. How many foods from the fruit group did Krista eat?
   A. 0 foods
   B. 1 food
   C. 2 foods
   D. Don't know

7. How many foods from the meat group did Krista eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

8. How many foods from the milk products group did Krista eat?
   A. 3 foods
   B. 4 foods
   C. 5 foods
   D. Don't know

9. How many foods from the vegetable group did Krista eat?
   A. 1 food
   B. 2 foods
   C. 3 foods
   D. Don't know

10. How many high-fiber foods did Krista eat?
   A. 2 foods
   B. 3 foods
   C. 4 foods
   D. Don't know

Len Carlton recorded the foods he ate for a usual day. Read the list of foods below, then answer questions 11-15.

BREAKFAST
banana
bagel with Swiss cheese
coffee

LUNCH
egg salad sandwich on white bread
green salad with Thousand Island dressing
whole milk
chocolate bar

DINNER
roast beef
biscuits with butter
cooked noodles with butter
coffee

SNACK
nuts

11. How many foods from the milk products group did Len eat?
    A. 1 food
    B. 2 foods
    C. 3 foods
    D. Don't know

12. How many foods from the meat group did Len eat?
    A. 1 food
    B. 2 foods
    C. 3 foods
    D. Don't know

13. How many foods from the grain and cereal group did Len eat?
    A. 2 foods
    B. 3 foods
    C. 4 foods
    D. Don't know

14. How many foods from the fruit group did Len eat?
    A. 0 foods
    B. 1 food
    C. 2 foods
    D. Don't know

15. Based on the foods that Len usually eats, which of the following seems to be true of his eating patterns?
    A. It seems that Len gets too much fat.
    B. It seems that Len gets too much fiber.
    C. It seems that Len gets too much sugar.
    D. Don't know

MAKING DIET CHANGES
(FORMS A & B)

This skill measure assesses participants' ability to identify appropriate dietary changes based on the *Dietary Guidelines*. The measure is appropriate for adults.

PURPOSE

Information regarding participants' ability to identify healthful changes in usual eating patterns may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' skill prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior skill of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' skill.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will remember how they answered each item on the pretest.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	C	B
2	A	C
3	A	A
4	B	A
5	D	A
6	B	C
7	D	B
8	B	C
9	C	D
10	A	C
11	C	B
12	B	D
13	C	A
14	A	D
15	D	B

The measures should be scored by counting the number of answers correct for each participant. Items left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' skill.

MAKING DIET CHANGES

Form A

This test describes people who want to make changes in their usual eating habits. These people also want to be sure to get all the recommended nutrients.

Read about each person. Then, circle the letter of the best action for the person to take. If there is no choice that is appropriate, circle choice D, NONE OF THE ABOVE.

1. Hank wants to reduce the amount of sodium in his diet. In addition to not salting his food, Hank should:

   A. Use catsup and mustard in place of salt to flavor meats.

   B. Snack on cheese and crackers instead of chips.

   C. Eat fresh, raw foods rather than canned ones whenever possible.

   D. None of the above.

2. Hilary wants to reduce the amount of saturated fat in her diet. In addition to switching from whole milk to skim milk, Hilary should:

   A. Use margarine rather than butter for cooking and to flavor foods.

   B. Fry foods, such as fish or chicken, rather than baking them.

   C. Eat a granola bar instead of cookies for a snack.

   D. None of the above.

3. Maria wants to reduce the number of calories in her diet. In addition to eating less food, Maria should:

   A. Choose ice milk instead of ice cream for a dessert.

   B. Use margarine instead of butter.

   C. Eat whole-grain bread, such as rye, rather than white bread.

   D. None of the above.

4. Lee wants to increase the amount of fiber in his diet. One appropriate way for Lee to do this is to:

   A. Choose white bread that is labeled "enriched" or "fortified."

   B. Eat more fruits and vegetables.

   C. Eat more milk products, such as yogurt.

   D. None of the above.

5. Daryl wants to increase the amount of starch in his diet. In addition to eating more bread, Daryl should:

   A. Eat more green, leafy vegetables, such as spinach.

   B. Use honey instead of sugar to sweeten foods.

   C. Eat more poultry or fish and less red meat.

   D. None of the above.

6. David wants to reduce the number of calories in his diet. In addition to eating less food, David should:

   A. Drink regular soft drinks instead of beer.

   B. Order baked chicken rather than fried chicken when eating out.

   C. Cut out all bread products and potatoes from his diet.

   D. None of the above.

7. Juanita wants to reduce the amount of sugar in her diet. In addition to cutting down on the table sugar she uses, Juanita should:

   A. Use molasses in place of sugar when cooking.

   B. Use fruit-flavored yogurt rather than sugar to sweeten fruit.

   C. Choose products that are made with high-fructose corn syrup instead of sugar.

   D. None of the above.

8. Seth wants to increase the amount of starch in his diet. In addition to eating more bread, Seth should:

   A. Eat more lean meat, such as fish and poultry.

   B. Eat more vegetables such as corn and peas.

   C. Eat more fruits, such as bananas.

   D. None of the above.

9. Terry wants to reduce the amount of cholesterol in his diet. In addition to cutting back on the number of eggs he eats, Terry should:

   A. Choose ice cream instead of a brownie for a dessert.

   B. Cut back on eating nuts and seeds.

   C. Substitute vegetable oil for butter when cooking.

   D. None of the above.

10. Peg wants to reduce the amount of fat in her diet. In addition to switching from whole milk to skim milk, Peg should:

   A. Use seasoned vinegar rather than regular salad dressing on salads.

   B. Eat fewer pasta and bread products.

   C. Use cream cheese instead of jam on bread or toast.

   D. None of the above.

11. Brian wants to reduce the amount of cholesterol in his diet. In addition to cutting back on the number of eggs he eats, Brian should:

   A. Eat more liver or kidney meat and less shellfish, such as crab.

   B. Use butter instead of mayonnaise on sandwiches.

   C. Drink skim milk rather than whole milk.

   D. None of the above.

12. Theresa wants to increase the amount of fiber in her diet. One appropriate way for Theresa to do this is to:

   A. Drink fruit juices instead of eating whole fruits.

   B. Eat more dried beans, such as pinto beans.

   C. Eat more rice and noodles.

   D. None of the above.

13. Jim wants to reduce the amount of sugar in his diet. In addition to cutting down on the table sugar he uses, Jim should:

    A. Use honey instead of jam on toast.

    B. Choose products that list "dextrose" or "molasses" instead of sugar as an ingredient.

    C. Eat plain yogurt instead of fruit-flavored yogurt.

    D. None of the above.

14. Sonya wants to reduce the amount of sodium in her diet. In addition to not salting her food, Sonya should:

    A. Eat fewer "convenience" foods, such as canned soups.

    B. Use margarine instead of butter to flavor foods.

    C. Use onion or garlic salts instead of table salt when cooking.

    D. None of the above.

15. Jacob wants to reduce the amount of fat in his diet. In addition to switching from whole milk to skim milk, Jacob should:

    A. Eat whole wheat bread instead of white bread.

    B. Snack on peanut butter and crackers instead of cheese and crackers.

    C. Choose cooking oils that are low in cholesterol.

    D. None of the above.

MAKING DIET CHANGES

Form B

This test describes people who want to make changes in their usual eating habits. These people also want to be sure to get all the recommended nutrients.

Read each description below. Circle the letter of the best action for the person to take. If there is no choice that is appropriate, circle choice D, NONE OF THE ABOVE.

1. Darnell wants to reduce the number of calories in his diet. In addition to eating less food, Darnell should:

   A. Snack on nuts instead of pretzels.

   B. Cut back on the amount of beer that he drinks.

   C. Use margarine instead of butter to flavor foods.

   D. None of the above.

2. Tanya wants to reduce the amount of sugar in her diet. In addition to cutting down on the table sugar she uses, Tanya should:

   A. Look for products that list "sucrose" or "dextrose" rather than sugar as an ingredient.

   B. Drink lemonade instead of regular soda.

   C. Select fruit canned in its own juice rather than in syrup.

   D. None of the above.

3. Shawna wants to increase the amount of fiber in her diet. One appropriate way for Shawna to do this is to:

   A. Eat rye bread instead of white bread.

   B. Eat more high-protein foods, such as eggs and nuts.

   C. Drink whole milk instead of low-fat or skim milk.

   D. None of the above.

4. Allison wants to reduce the amount of sodium in her diet. In addition to not salting her food, Allison should:

   A. Fix home-prepared meals instead of frozen dinners.

   B. Use garlic salt or onion salt instead of table salt when cooking.

   C. Choose Italian rather than mayonnaise-type dressing for salads.

   D. None of the above.

5. Eric wants to reduce the number of calories in his diet. In addition to eating less food, Eric should:

   A. Snack on plain popcorn instead of crackers.

   B. Eat foods that are made only with natural ingredients.

   C. Cook with oil rather than shortening, whenever possible.

   D. None of the above.

6. Pat wants to increase the amount of starch in her diet. In addition to eating more bread, Pat should:

   A. Eat more milk products, such as cottage cheese.

   B. Drink more fruit juice, such as orange juice.

   C. Eat more foods such as rice and noodles.

   D. None of the above.

7. Arthur wants to reduce the amount of fat in his diet. In addition to switching from whole milk to skim milk, Arthur should:

   A. Limit the amount of beer he drinks.

   B. Use chicken or turkey for sandwiches instead of salami.

   C. Choose fried chicken instead of a hamburger when eating out.

   D. None of the above.

8. Julia wants to reduce the amount of cholesterol in her diet. In addition to cutting back on the number of eggs she eats, Julia should:

   A. Cut out bread and cereal products from her diet.

   B. Eat fresh foods instead of canned foods, whenever possible.

   C. Season vegetables with margarine rather than butter.

   D. None of the above.

9. Dennis wants to reduce the amount of sodium in his diet. In addition to not salting his food, Dennis should:

   A. Choose whole wheat bread rather than white bread.

   B. Use soy sauce instead of salt to flavor rice and vegetables.

   C. Choose canned soups instead of dried, packaged soups.

   D. None of the above.

10. Lakeeta wants to increase the amount of fiber in her diet. One appropriate way for Lakeeta to do this is to:

   A. Eat more milk products, such as yogurt.

   B. Eat more lean meat, such as poultry and fish.

   C. Eat more dried beans and peas.

   D. None of the above.

11. Melody wants to reduce the amount of fat in her diet. In addition to switching from whole milk to skim milk, Melody should:

   A. Use peanut butter instead of jam on toast.

   B. Choose gingersnap cookies instead of chocolate chip cookies for a dessert.

   C. Drink fruit juice instead of soda.

   D. None of the above.

12. Len wants to reduce the amount of sugar in his diet. In addition to cutting down on the table sugar he uses, Len should:

   A. Use honey instead of sugar to sweeten tea and coffee.

   B. Use jelly instead of maple syrup on pancakes.

   C. Eat frozen yogurt instead of ice cream for a dessert.

   D. None of the above.

13. Lance wants to increase the amount of starch in his diet. In addition to eating more bread, Lance should:

   A. Eat more beans, such as lima and kidney beans.

   B. Eat more vegetables, such as broccoli and Brussels sprouts.

   C. Eat more milk products, such as cheese and yogurt.

   D. None of the above.

14. Lars wants to reduce the amount of cholesterol in his diet. In addition to cutting back on the number of eggs he eats, Lars should:

    A. Use cream cheese instead of margarine on toast.

    B. Use only egg yolks in recipes calling for whole eggs.

    C. Drink whole milk instead of skim milk.

    D. None of the above.

15. Marla wants to reduce the amount of fat in her diet. In addition to switching from whole milk to skim milk, Marla should:

    A. Snack on nuts instead of chips.

    B. Cook poultry without its skin.

    C. Order sauteed foods instead of fried foods when eating out.

    D. None of the above.

CHANGING EATING PATTERNS
(FORMS A & B)

This skill measure assesses participants' ability to identify appropriate dietary changes based on the *Dietary Guidelines*. The measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' ability to identify healthful changes in usual eating patterns may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' skill prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior skill of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' skill.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 10 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will remember how they answered each item on the pretest.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	C	B
2	B	C
3	A	A
4	C	A
5	A	C
6	C	B
7	B	A
8	B	C
9	A	A
10	A	B

The measures should be scored by counting the number of answers correct for each participant. Items left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' skill.

CHANGING EATING PATTERNS

Form A

This test is about people who want to change their usual eating habits. These people also want to be sure to get all the recommended nutrients.

Read about each person. Then, circle the letter of the best action for the person to take.

1. Brian wants to lower the amount of sodium in his diet. In addition to not salting his food, Brian should:
   A. Choose canned soup instead of hot dogs for lunch.
   B. Snack on cheese and crackers instead of chips.
   C. Eat fresh, raw foods rather than canned ones whenever possible.

2. Carla wants to lower the amount of fat in her diet. In addition to switching from whole milk to skim milk, Carla should:
   A. Use cream cheese instead of jam on toast.
   B. Eat chicken without the skin instead of chicken with the skin.
   C. Eat peanut butter and crackers for a snack instead of pretzels.

3. Maria wants to lower the number of calories in her diet. In addition to eating less food, Maria should:
   A. Snack on plain popcorn instead of granola bars.
   B. Cut out all milk products from her diet.
   C. Eat whole wheat bread instead of white bread.

4. Lea wants to get more fiber in her diet. One good way for Lea to do this is to:
   A. Eat more milk products, such as yogurt.
   B. Eat more white bread that is "enriched" or "fortified."
   C. Eat more fruits and vegetables.

5. Andy wants to lower the amount of fat in his diet. In addition to switching from whole milk to skim milk, Andy should:

   A. Choose frozen yogurt instead of ice cream for a dessert.

   B. Drink fruit juices instead of sodas.

   C. Choose chicken nuggets instead of a hamburger when eating out.

6. Rick wants to lower the number of calories in his diet. In addition to eating less food, Rick should:

   A. Use margarine instead of butter to flavor foods.

   B. Use honey instead of sugar to sweeten foods.

   C. Choose a baked potato rather than french fries when eating out.

7. Juanita wants to lower the amount of sugar in her diet. One good way for Juanita to do this is to:

   A. Use honey instead of jam on toast.

   B. Eat fresh, raw fruit instead of fruit canned in syrup.

   C. Drink fruit punch or lemonade instead of soda.

8. Seth wants to get more starch in his diet. In addition to eating more bread, Seth should:

   A. Eat more fish and poultry.

   B. Eat more vegetables such as corn or peas.

   C. Snack on fruit instead of cookies.

9. Jody wants to lower the amount of cholesterol in her diet. In addition to cutting back on the number of eggs she eats, Jody should:

   A. Drink skim milk instead of whole milk.

   B. Cut back on the amount of rice and noodles she eats.

   C. Use butter instead of mayonnaise on sandwiches.

10. Daryl wants to lower the amount of sodium in his diet. In addition to not salting his food, Daryl should:

    A. Choose tuna instead of lunchmeat for sandwiches.

    B. Use mustard or catsup instead of salt to flavor hamburgers.

    C. Snack on dill pickles instead of pretzels or chips.

CHANGING EATING PATTERNS

Form B

This test is about people who want to change their usual eating habits. These people also want to be sure to get all the recommended nutrients.

Read about each person. Then, circle the letter of the best action for the person to take.

1. Jimmy wants to lower the number of calories in his diet. In addition to eating less food, Jimmy should:

   A. Use margarine instead of butter on toast.

   B. Choose baked or broiled chicken instead of fried chicken.

   C. Use honey instead of sugar to sweeten foods.

2. Tanya wants to lower the amount of sugar in her diet. In addition to cutting down on the table sugar she uses, Tanya should:

   A. Drink fruit punch or lemonade instead of soda.

   B. Choose products that list "sucrose" or "corn syrup" instead of sugar.

   C. Eat plain or vanilla yogurt instead of fruit-flavored yogurt.

3. Kris wants to get more fiber in her diet. One good way for Kris to do this is to:

   A. Eat more whole-grain breads, such as rye bread.

   B. Eat more high-protein foods, such as nuts.

   C. Eat more lean meats, such as fish and chicken.

4. Dianna wants to lower the amount of sodium in her diet. In addition to not salting her food, Dianna should:

   A. Choose peanut butter and jelly instead of lunchmeat for sandwiches.

   B. Use garlic salt or onion salt instead of table salt to flavor foods.

   C. Eat cottage cheese instead of yogurt for a snack.

5. Shane wants to get more starch in his diet. In addition to eating more bread, Shane should:

   A. Eat more fruits, such as apples and oranges.

   B. Drink milk instead of soda.

   C. Eat more foods such as spaghetti or rice.

6. Arthur wants to lower the amount of fat in his diet. In addition to switching from whole milk to skim milk, Arthur should:

   A. Snack on nuts instead of popcorn or crackers.

   B. Eat cereal instead of doughnuts for breakfast.

   C. Use butter instead of mayonnaise on sandwiches.

7. Evelyn wants to lower the amount of cholesterol in her diet. In addition to cutting back on the number of eggs she eats, Evelyn should:

   A. Drink skim milk instead of whole milk.

   B. Eat ice cream instead of pie for a dessert.

   C. Choose cheese instead of peanut butter for sandwiches.

8. Dennis wants to lower the amount of sodium in his diet. In addition to not salting his food, Dennis should:

   A. Eat canned vegetables instead of plain, frozen vegetables.

   B. Use catsup or barbecue sauce instead of salt to flavor meats.

   C. Snack on raisins instead of crackers.

9. Lakeeta wants to get more fiber in her diet. One good way for Lakeeta to do this is to:

   A. Eat whole fruits, such as apples, instead of drinking fruit juice.

   B. Eat poultry and fish instead of red meat.

   C. Snack on yogurt instead of cheese.

10. Melissa wants to lower the amount of fat in her diet. In addition to switching from whole milk to skim milk, Melissa should:

    A. Drink juice instead of soda for a snack.

    B. Snack on pretzels instead of potato or corn chips.

    C. Use melted cheese instead of butter on vegetables.

WHAT'S ON A LABEL?
(FORMS A & B)

This skill measure assesses participants' ability to read and interpret nutrition labels and advertising claims. The measure is appropriate for adults and older adolescents.

PURPOSE

Information regarding participants' ability to interpret nutrition labels may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' skill prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior skill of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' skill.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 15 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will remember how they answered each item on the pretest.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	C	A
2	B	C
3	B	B
4	C	A
5	A	C
6	C	A
7	B	B
8	B	C
9	A	B
10	C	B
11	C	A
12	B	B
13	A	A
14	C	C
15	A	C

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' skill.

WHAT'S ON A LABEL?

Form A

This test consists of 15 questions about reading food labels. Read the food labels below, then answer questions 1-5. Circle the letter of the best answer for each question. If you are not sure about an answer, circle choice D, DON'T KNOW.

CRISPY SQUARES

Nutrition Information Per Serving

Serving size: 1 cup
Servings per package: 18

	Cereal	With 1/2 cup skim milk*
Calories	110	155 *
Protein (grams)	1 g	5 g
Carbohydrate (grams)	25 g	31 g
Fat (grams)	0 g	0 g*
Cholesterol (milligrams)	0 mg	0 mg*
Sodium (milligrams)	280 mg	340 mg

* Whole milk supplies an additional 30 calories, 4g fat, and 15mg cholesterol per serving.

Ingredients: Milled rice, sugar, raisins, salt, malt syrup.

TASTY FLAKES

Nutrition Information Per Serving

Serving size: 1 cup
Servings per package: 10

	Cereal	With 1/2 cup skim milk*
Calories	130	175 *
Protein (grams)	3 g	7 g
Carbohydrates (grams)	32 g	38 g
Fat (grams)	0 g	0 g*
Cholesterol (milligrams)	0 mg	0 mg*
Sodium (milligrams)	170 mg	230 mg

* Whole milk supplies an additional 30 calories, 4g fat, and 15mg cholesterol per serving.

Ingredients: Whole wheat kernels, milled rice, raisins, malt flavoring, salt.

1. If you ate 1 cup of Tasty Flakes with 1/2 cup of **whole milk**, how many calories would you have eaten?
   A. 160 calories
   B. 175 calories
   C. 205 calories
   D. Don't know

2. Which of the following ingredients of Crispy Squares is present in the largest amount (by weight)?
   A. malt syrup
   B. milled rice
   C. salt
   D. Don't know

3. Which cereal would you choose if you were trying to cut down on the amount of sodium in your diet?
   A. Crispy Squares
   B. Tasty Flakes
   C. Can't tell from label
   D. Don't know

4. Which cereal has more raisins?
   A. Crispy Squares
   B. Tasty Flakes
   C. Can't tell from label
   D. Don't know

5. If you ate one serving of Crispy Squares without milk as a snack, how many calories would you have eaten?
   A. 110 calories
   B. 130 calories
   C. 155 calories
   D. Don't know

Use the information on the two food labels below to answer questions 6-10.

NACHO MUNCHIES

Nutrition Information Per Serving

Serving size: 1 ounce
Servings per package: 2

Calories	**120**
Protein (grams)	**4 g**
Carbohydrate (grams)	**7 g**
Fat (grams)	**4 g**
Sodium (milligrams)	**210 mg**

Ingredients: Corn, whole wheat flour, sunflower oil, cheese, chili, pepper, salt, spices.

CHEESE CHIPS

Nutrition Information Per Serving

Serving size: 1 ounce
Servings per package: 2

Calories	**160**
Protein (grams)	**2 g**
Carbohydrate (grams)	**15 g**
Fat (grams)	**11 g**
Sodium (milligrams)	**320 mg**

Ingredients: Corn, vegetable oil, salt, spices, romano cheese, flour, cheddar cheese, buttermilk, corn syrup.

6. If you ate the entire package of Cheese Chips, how much sodium would you have eaten?
   A. 320 mg
   B. 420 mg
   C. 640 mg
   D. Don't know

7. If you ate one serving of Nacho Munchies, how many calories would you have eaten?
   A. 60 calories
   B. 120 calories
   C. 240 calories
   D. Don't know

8. Which chips would you choose if you were trying to lower the amount of fat in your diet?
   A. Cheese Chips
   B. Nacho Munchies
   C. Can't tell from label
   D. Don't know

9. Which chips contain a form of sugar?
   A. Cheese Chips
   B. Nacho Munchies
   C. Can't tell from label
   D. Don't know

10. Which chips contain the most corn?
   A. Cheese Chips
   B. Nacho Munchies
   C. Can't tell from label
   D. Don't know

Read the following questions and circle the letter of the best answer for each question. If you are not sure about an answer, circle choice D, DON'T KNOW.

11. It says on a box of granola cereal that the cereal is "100 percent natural." Which of the following best describes what is meant by the word "natural" for this food?
   A. The granola does not contain preservatives.
   B. The granola does not contain sugar.
   C. There is no way to know what is meant by the word "natural."
   D. Don't know

12. New kinds of potato chips are available that are "naturally flavored." Which of the following best describes what is meant by the words "naturally flavored" for this food?

    A. The chips do not contain any artificial colors or preservatives.

    B. The chips are flavored with spices, juices, or other natural sources.

    C. There is no way to know what is meant by the words "naturally flavored."

    D. Don't know

13. It says on a package of bread that the bread is "enriched." Which of the following best describes what is meant by the word "enriched" for this food?

    A. The product contains certain added vitamins and minerals.

    B. The product contains added fiber.

    C. There is no way to know what is meant by the word "enriched."

    D. Don't know

14. A manufacturer of corn chips advertises a product called "Lite Corn Chips." Which of the following best describes what is meant by the word "lite" for this food?

    A. The chips contain fewer calories than other chips.

    B. The chips contain less fat than other chips.

    C. There is no way to know what is meant by the word "lite."

    D. Don't know

15. It says on a can of soup that the soup contains "no salt." Which of the following best describes what is meant by "no salt" for this food?

    A. The soup does not contain salt, but could contain sodium.

    B. The soup does not contain salt or sodium.

    C. There is no way to know what is meant by the words "no salt."

    D. Don't know

WHAT'S ON A LABEL?

Form B

This test consists of 15 questions about reading food labels. Read the labels below, then answer questions 1-5. Circle the best answer for each question. If you are not sure about an answer, circle choice D, DON'T KNOW.

APPLE SNACK BAR

Nutrition Information Per Serving

Serving Size: 1 Bar
Servings Per Package: 2

Calories	**120**
Protein (grams)	**1 g**
Carbohydrate (grams)	**19 g**
Fat (grams)	**4 g**
Sodium (milligrams)	**55 mg**

Ingredients: Concentrated fruit juices, whole wheat flour, oats, soybean oil, natural flavorings, nonfat dry milk, salt, spices.

PEANUT BUTTER SNACK BAR

Nutrition Information Per Serving

Serving Size: 1 Bar
Servings Per Package: 2

Calories	**200**
Protein (grams)	**3 g**
Carbohydrate (grams)	**20 g**
Fat (grams)	**12 g**
Sodium (milligrams)	**100 mg**

Ingredients: Milk chocolate, palm kernel oil, oats, sugar, peanut meal, crisp rice, brown sugar, nonfat dry milk, corn syrup, salt.

1. Which snack bar would you choose if you were trying to cut down on the amount of sugar in your diet?

   A. The apple bar

   B. The peanut butter bar

   C. Can't tell from label

   D. Don't know

2. Which snack bar has more oats?
   A. The apple bar
   B. The peanut butter bar
   C. Can't tell from label
   D. Don't know

3. If you ate one apple bar, how many calories would you have eaten?
   A. 60 calories
   B. 120 calories
   C. 200 calories
   D. Don't know

4. Which of the following ingredients of the peanut butter bar is present in the largest amount (by weight)?
   A. Milk chocolate
   B. Peanut meal
   C. Nonfat dry milk
   D. Don't know

5. If you ate one package of peanut butter bars, how much fat would you have eaten?
   A. 6 grams
   B. 12 grams
   C. 24 grams
   D. Don't know

Use the information on the two food labels below to answer questions 6-10.

TOASTED ROUNDS

Nutrition Information Per Serving

Serving Size: 1 ounce (6 crackers)
Servings Per Package: 10

Calories	**150**
Protein (grams)	**4 g**
Carbohydrate (grams)	**16 g**
Fat (grams)	**9 g**
Sodium (milligrams)	**250 mg**

KRISPY SQUARES

Nutrition Information Per Serving

Serving Size: 1 ounce (6 crackers)
Servings Per Package: 10

Calories	**110**
Protein (grams)	**2 g**
Carbohydrate (grams)	**16 g**
Fat (grams)	**2 g**
Sodium (milligrams)	**420 mg**

6. Which crackers would you choose if you were trying to lower the amount of sodium in your diet?

   A. Toasted Rounds

   B. Krispy Squares

   C. Can't tell from label

   D. Don't know

7. Which crackers would you choose if you were trying to lower the amount of fat in your diet?

   A. Toasted Rounds

   B. Krispy Squares

   C. Can't tell from label

   D. Don't know

8. Which crackers contain more fiber per serving?
   A. Toasted Rounds
   B. Krispy Squares
   C. Can't tell from label
   D. Don't know

9. If you ate six Krispy Squares, how many calories would you have eaten?
   A. 60 calories
   B. 110 calories
   C. 150 calories
   D. Don't know

10. If you ate 12 Toasted Rounds, how much protein would you have eaten?
   A. 4 grams
   B. 8 grams
   C. 16 grams
   D. Don't know

Read the following questions and circle the letter of the best answer for each question. If you are not sure about an answer, circle choice D, DON'T KNOW.

11. It says on a package of beef that the beef is "natural." Which of the following describes what is meant by the word "natural" for this food?
   A. The meat does not have any artificial ingredients and is minimally processed.
   B. The meat is naturally low in fat and cholesterol.
   C. There is no way to know what is meant by the word "natural."
   D. Don't know

12. It says on a package of cereal that the cereal is "fortified." Which of the following best describes what is meant by the word "fortified" for this food?

    A. The cereal contains added fiber.

    B. The cereal contains added vitamins and minerals.

    C. There is no way to know what is meant by the word "fortified."

    D. Don't know

13. It says on a package of chips that the chips are "unsalted." Which of the following describes what is meant by the word "unsalted" for this food?

    A. The chips do not contain salt, but could contain sodium.

    B. The chips do not contain salt or sodium.

    C. There is no way to know what is meant by the word "unsalted."

    D. Don't know

14. It says on a jar of spaghetti sauce that the sauce is "all natural." Which of the following describes what is meant by the words "all natural" for this food?

    A. The spaghetti sauce does not contain preservatives.

    B. The spaghetti sauce does not contain sugar.

    C. There is no way to know what is meant by the words "all natural."

    D. Don't know

15. It says on a package of frozen fish that the fish is "extra light." Which of the following best describes what is meant by the words "extra light" for this food?

    A. The fish has less fat than other frozen fish.

    B. The fish has fewer calories than other frozen fish.

    C. There is no way to know what is meant by the words "extra light."

    D. Don't know

MODIFYING RECIPES
(FORMS A & B)

This skill measure assesses participants' ability to modify recipes in accordance with the *Dietary Guidelines*. The measure is appropriate for adults and older adolescents.

PURPOSE

Information regarding participants' ability to modify recipes to make them more healthful may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, the results may be used to assess participants' skill prior to program participation. Decisions about how to allocate instructional time can then be made based on the prior skill of participants.
- When the measure is administered prior to and following a program, it is possible to evaluate growth in participants' skill.

PROCEDURES

Because the equidifficulty of the forms has not been established, it is best not to give all of the participants Form A as a pretest and Form B as a posttest. Instead, choose either of the following methods.

- Review Forms A and B and select one. Give all participants the selected form both before and after the program. Alternatively, select 10 items from the two forms and construct a measure most consistent with the program emphasis. Then administer the "new" form both before and after the program.
- Give Form A to half of the incoming participants and Form B to the remaining half. To distribute the forms randomly, order them "ABABAB" and hand them out. Following the program, give each participant the form not previously taken. For example, if a participant was given Form B before the program, then that participant should be given Form A following the program. This approach eliminates the possibility that examinees will remember how they answered each item on the pretest.

SCORING AND ANALYSIS

The answer keys for the two forms are provided below:

Item No.	Form A	Form B
1	B	B
2	A	C
3	B	B
4	A	A
5	C	A
6	C	B
7	A	A
8	A	C
9	C	B
10	B	C

The measures should be scored by counting the number of answers correct for each participant. Items marked "Don't know" or left blank should be scored as incorrect. Next, total the correct answers for the group and divide by the number of participants in the group. The mean number of correct answers and the standard deviation can be used to summarize participants' performance on the measure. Means and standard deviations from before and after the program can be compared to determine changes in participants' skill.

MODIFYING RECIPES

Form A

This test consists of 10 questions about changing recipes to make them more healthful. Read the recipes below, then answer the questions following each recipe. Circle one answer for each question. If you don't know the answer to a question, circle choice D, DON'T KNOW.

BEST-EVER MUFFINS

1 3/4 cups sifted all-purpose flour
1/4 cup sugar
2 1/2 tsp. baking powder
3/4 tsp. salt
1 well-beaten egg
3/4 cup whole milk
1/3 cup butter (melted)
1/2 cup raisins
1/2 cup chopped walnuts

Sift dry ingredients into bowl; make well in center. Combine egg, milk, and butter. Add all at once to dry ingredients. Stir quickly just until dry ingredients are moistened. Stir in raisins and nuts. Fill greased muffin pans 2/3 full. Bake at 400° for 20 to 25 minutes. Makes 10.

1. Which of the following describes one way to reduce the amount of cholesterol in this recipe?
   A. Cut out the chopped walnuts.
   B. Substitute two egg whites for the whole egg.
   C. Substitute 1 cup of whole wheat flour for 1 cup of all-purpose flour.
   D. Don't know

2. Which of the following describes one way to reduce the amount of saturated fat in this recipe?
   A. Substitute margarine for the butter.
   B. Use chopped pecans instead of walnuts.
   C. Use evaporated milk in place of the whole milk.
   D. Don't know

3. Which of the following describes one way to increase the amount of fiber in this recipe?
   A. Use 1/2 cup of blueberries instead of the raisins.
   B. Substitute 1 cup of whole wheat flour for 1 cup of all-purpose flour.
   C. Use 1/4 cup brown sugar in place of the white sugar.
   D. Don't know

Use the recipe below to answer questions 4-6.

SCALLOP-CHEESE BAKE

1 pound fresh or frozen scallops
1 tbsp. finely chopped onion
3 tbsp. butter
3 tbsp. all-purpose flour
1/2 tsp. garlic powder
3/4 cup whole milk
3-ounce can chopped mushrooms; drain and save liquid
2 tbsp. grated Parmesan cheese
1/2 cup American cheese, shredded
1 1/2 cups crushed potato chips

Thaw scallops; rinse. Cover scallops with cold water. Bring to boil; reduce heat and simmer 2 minutes. Drain, reserving about 1 cup of the liquid. Slice scallops about 1/4 inch thick.

Cook onion in butter until tender. Blend in flour and spices. Add reserved cooking liquid, liquid from canned mushrooms, and milk. Cook and stir until thickened. Remove from heat. Stir in mushrooms, Parmesan, and scallops. Turn into 1 1/2-quart casserole; sprinkle with American cheese; top with potato chips. Bake at 350° for 20 to 25 min.

4. Which of the following describes one way to reduce the amount fat in this recipe?
   A. Use bread crumbs instead of crushed potato chips.
   B. Use 1/4 cup of sour cream for 1/4 cup of whole milk.
   C. Use whole wheat flour rather than all-purpose flour.
   D. Don't know

5. Which of the following describes a second way to reduce the amount of fat in this recipe?
   A. Replace the butter with cooking oil.
   B. Use Cheddar cheese instead of American cheese.
   C. Use skim milk instead of whole milk.
   D. Don't know

6. Which of the following describes one way to reduce the amount of sodium in this recipe?
   A. Use fresh garlic instead of garlic powder.
   B. Use margarine instead of butter.
   C. Use raw mushrooms instead of canned mushrooms.
   D. Don't know

Use the recipe below to answer questions 7-10.

CHEF'S SALAD BOWL

1 medium head iceberg lettuce
2 stalks celery, chopped
1 large tomato, cut in wedges
2 cups ham chunks
8 ounces Cheddar cheese, sliced
1/3 cup olives, sliced
3 hard-cooked eggs, sliced
seasoned croutons
creamy French dressing

Tear lettuce into bite-size pieces. Arrange other ingredients, except croutons and dressing on top of lettuce. Top with croutons; toss with dressing.

7. Which of the following describes one way to reduce the amount of fat in this recipe?
   A. Use Mozzarella cheese instead of Cheddar cheese.
   B. Use Thousand Island instead of French dressing.
   C. Replace the olives with avocado slices.
   D. Don't know

8. Which of the following describes a second way to reduce the amount of fat in this recipe?
   A. Toss the salad with seasoned vinegar instead of French dressing.
   B. Use crumbled bacon instead of croutons on top of salad.
   C. Use 1/3 cup sunflower seeds in place of the olives.
   D. Don't know

9. Which of the following describes one way to reduce the amount of sodium in this recipe?
   A. Replace the Cheddar cheese with Swiss cheese.
   B. Use sliced pickles instead of the chopped celery.
   C. Use chicken or turkey instead of ham.
   D. Don't know

10. Which of the following describes one way to increase the amount of fiber in this recipe?
   A. Use red leaf lettuce instead of iceberg lettuce.
   B. Use kidney beans in place of the olives.
   C. Add another hard-cooked egg.
   D. Don't know

MODIFYING RECIPES

Form B

This test consists of 10 questions about changing recipes to make them more healthful. Read the recipes below, then answer the questions following each recipe. Circle one answer for each question. If you don't know the answer to a question, circle choice D, DON'T KNOW.

BEEF STROGANOFF

1 pound beef sirloin, sliced in 1/4 inch strips
1 tbsp. flour
1/2 tsp. salt
2 tbsp. butter
1 3-ounce can sliced mushrooms, drain and save liquid
1/2 cup chopped onion

. . . . . .

2 tbsp. butter
3 tbsp. flour
2 tbsp. tomato paste
1 10 1/2 ounce can condensed beef broth
1 cup sour cream
Hot noodles

Combine 1 tbsp. flour and salt. Coat meat with flour mixture. Brown meat in 2 tbsp. of butter. Add mushrooms and onion; cook 3-4 minutes. Remove meat and mushrooms from pan. Blend remaining butter and flour into pan drippings. Add tomato paste, beef broth, and mushroom liquid. Cook and stir until thick. Return meat and mushrooms to skillet. Stir in sour cream. Heat through; do not boil. Serve over hot noodles.

1. Which of the following describes one way to reduce the amount of fat in this recipe?
   A. Use shortening instead of butter.
   B. Use round steak in place of sirloin steak.
   C. Serve the beef over rice instead of noodles.
   D. Don't know

2. Which of the following describes a second way to reduce the amount of fat in this recipe?
   A. Use raw mushrooms instead of canned mushrooms.
   B. Substitute pork for the beef.
   C. Use 1/2 cup buttermilk for 1/2 cup of sour cream.
   D. Don't know

3. Which of the following describes one way to reduce the amount of sodium in this recipe?
   A. Substitute margarine for the butter.
   B. Use raw mushrooms instead of canned mushrooms.
   C. Substitute catsup in place of the tomato paste.
   D. Don't know

4. Which of the following describes a second way to reduce the amount of sodium in this recipe?
   A. Use half beef broth and half water, instead of all broth.
   B. Use chicken broth instead of the beef broth.
   C. Use seasoned salt instead of table salt.
   D. Don't know

Use the recipe below to answer questions 5-7.

CHOCOLATE CHIP COOKIES

2 1/4 cups all-purpose flour
1 tsp. baking soda
1/2 tsp. salt
1 cup butter
3/4 cup brown sugar
3/4 cup sugar
1 tsp. vanilla
2 eggs
2 cups milk chocolate chips
1 cup shredded coconut
1 cup chopped walnuts

Combine flour, baking soda, and salt; set aside. Cream butter, sugars, and vanilla; beat in eggs. Gradually add flour mixture, mix well. Stir in chocolate chips, coconut, and nuts. Bake on ungreased cookie sheets at 375° for 8 to 10 minutes.

5. Which of the following describes one way to reduce the amount of fat in this recipe?
   A. Use 1 cup raisins for 1 cup of chocolate chips.
   B. Use chopped pecans instead of walnuts.
   C. Cut back the amount of white sugar by 1/4 cup.
   D. Don't know

6. Which of the following describes a second way to reduce the amount of fat in this recipe?
   A. Use sweet butter instead of regular butter.
   B. Use 1 cup of oatmeal in place of the shredded coconut.
   C. Use semisweet chocolate chips instead of milk chocolate chips.
   D. Don't know

7. Which of the following describes one way to increase the amount of fiber in this recipe?
   A. Use 1 cup of whole wheat flour in place of 1 cup of all-purpose flour.
   B. Use all brown sugar instead of brown and white sugar.
   C. Add an extra egg to the recipe.
   D. Don't know

Use the recipe below to answer questions 8-10.

MY FAVORITE PIZZA

Crust

2 cups all-purpose flour
1 tsp. baking powder
1/2 tsp. salt
2/3 cup whole milk
1/4 cup vegetable oil

Topping

1 8-ounce can pizza sauce
1/2 tsp. Italian seasoning
2 tbsp. butter
1/2 cup chopped onion
1 cup sliced mushrooms
1 pound ground pork sausage, fully cooked and drained
2 cups Mozzarella cheese, shredded
1 cup chopped olives

Combine flour, baking powder, and salt. Add milk and oil. Stir until mixture forms a ball. Knead about 10 times. Press dough into 14-inch greased pizza pan. Meanwhile, cook ground pork sausage; drain off excess fat. Saute onion and mushrooms in butter for about 3 minutes. Spoon pizza sauce over crust. Top with sauteed vegetables and cooked sausage. Sprinkle with cheese, olives, and seasoning. Bake at 425° for 15 minutes.

8. Which of the following describes one way to reduce the amount of fat in this recipe?
   A. Use margarine instead of vegetable oil in the crust.
   B. Use sliced tomatoes in place of sliced mushrooms.
   C. Substitute 1/2 pound ground beef for 1/2 pound pork sausage.
   D. Don't know

9. Which of the following describes a second way to reduce the amount of fat in this recipe?
   A. Use 1 cup of whole wheat flour in place of 1 cup all-purpose flour.
   B. Use skim milk instead of whole milk for the crust.
   C. Use natural Cheddar cheese instead of Mozzarella cheese.
   D. Don't know

10. Which of the following describes one way to reduce the amount of sodium in this recipe?
   A. Use ham chunks instead of sausage for topping.
   B. Use garlic salt instead of table salt in the crust.
   C. Use chopped green pepper instead of chopped olives.
   D. Don't know

WOULD YOU TRY THESE?

This affective measure assesses participants' willingness to try a variety of foods, primarily fruits, vegetables, and grain products. This measure is appropriate for adults.

PURPOSE

Information regarding participants' willingness to try a variety of foods may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results of this measure may show that participants are not willing to try a variety of familiar or unfamiliar foods. This would emphasize the need to address the importance of including a variety of foods (especially fruits, vegetables, and grain products) in the diet.
- When this measure is administered prior to and following a program, it is possible to evaluate changes in participants' willingness to try new foods.

PROCEDURES

In most cases, this measure should be administered both at the beginning and end of a program. The measure can, however, be administered at the beginning of a program only for needs assessment purposes as described above.

Handbook users should be alert to concerns regarding the potential reactivity of affective measures. A measure is considered *reactive* if the experience of completing the measure prior to the program causes participants to react differently to the program. Handbook users should, therefore, carefully review each affective measure that they wish to use to determine its potential for making participants unduly sensitive to aspects of the program. If a measure is determined to be reactive, then program personnel should *not* administer that measure to all participants as a pretest and posttest. Instead, the measure could be administered to half of the program participants prior to program participation to determine participants' pre-program status. The measure could then be administered to the other half of the participants after program participation to assess participants' post-program status.

SCORING AND ANALYSIS

This questionnaire can be scored in two ways. One procedure relies on the responses to the question *Have You Tried This?*, providing a group estimate of the variety of foods tried by participants. A second procedure relies on the responses to the question *Would You Try This?*, providing an estimate of participants' willingness to try new foods. Question 31 should be analyzed separately.

Method One: Average number of foods tried by participants

1. Count the number of **Yes** responses to the question "*Have You Tried This?*" for all participants.
2. Divide this total by the *total* number of responses. (When counting the total number of responses, ignore blanks and items marked **Don't Know This Food**.)
3. The resulting score, which may range from 0% (0 foods tried) to 100% (30 foods tried), indicates the average percentage of the 30 foods listed on the measure that were tried by participants. Percentages from before and after the program can be compared to indicate a change in the number of the foods tried by participants.

> *EXAMPLE: Suppose that there are 10 program participants. First, add up all the* **Yes** *responses to the question "Have You Tried This?" Assume the total is 200. Divide this total by the total number of responses from all participants to get an average percentage of the 30 foods tried by participants. Assume the total number of responses is 300. Thus, for this example, participants had tried approximately 67% (or roughly 20 foods) of the 30 foods listed on the measure.*

Method Two: Willingness to try new foods

1. Count the number of **Yes** responses to the question *"Would You Try This?"* for all participants. Next, count the **No** responses and, finally, the **Maybe** responses.
2. Divide each of the three subtotals by the *total* of all responses (i.e., the total of all **Yes**, **No**, and **Maybe** responses). Do not include blank items when counting the total number of responses. (See above example.)
3. The resulting scores indicate the average percentage of the foods *not previously tried* that participants would (a) try, (b) not try, and (c) consider trying. Percentages from before and after the program can be compared to indicate changes in participants' willingness to try new foods.

Question 31:

Calculate the percentage of participants responding either **Yes**, **No**, or **Maybe**. Percentages from before and after a program can be compared to indicate changes in participants' willingness to taste new foods.

WOULD YOU TRY THESE?

Various foods are listed below. Use a check to show whether you have tried each food. For any foods you have not tried, use a check to show whether you would be willing to try those foods. If you have not heard of a food, put a check under DON'T KNOW THIS FOOD.

	Have you tried this?			Would you try this?		
	Yes	No	Don't Know This Food	Yes	No	Maybe
1. Mango	( )	( )	( )	( )	( )	( )
2. Blueberries	( )	( )	( )	( )	( )	( )
3. Honeydew Melon	( )	( )	( )	( )	( )	( )
4. Kiwifruit	( )	( )	( )	( )	( )	( )
5. Cantaloupe	( )	( )	( )	( )	( )	( )
6. Nectarine	( )	( )	( )	( )	( )	( )
7. Apricot	( )	( )	( )	( )	( )	( )
8. Papaya	( )	( )	( )	( )	( )	( )
9. Brown Rice	( )	( )	( )	( )	( )	( )
10. Whole Wheat Pasta	( )	( )	( )	( )	( )	( )
11. Oatmeal	( )	( )	( )	( )	( )	( )
12. Rye Bread	( )	( )	( )	( )	( )	( )
13. Bulgur	( )	( )	( )	( )	( )	( )
14. Wheat Crackers	( )	( )	( )	( )	( )	( )

	Have you tried this?			Would you try this?		
	Yes	No	Don't Know This Food	Yes	No	Maybe
15. Broccoli	( )	( )	( )	( )	( )	( )
16. Collard Greens	( )	( )	( )	( )	( )	( )
17. Jicama	( )	( )	( )	( )	( )	( )
18. Sweet Potatoes	( )	( )	( )	( )	( )	( )
19. Garbanzo Beans	( )	( )	( )	( )	( )	( )
20. Black-eyed Peas	( )	( )	( )	( )	( )	( )
21. Lima Beans	( )	( )	( )	( )	( )	( )
22. Pinto Beans	( )	( )	( )	( )	( )	( )
23. Brussels Sprouts	( )	( )	( )	( )	( )	( )
24. Cauliflower	( )	( )	( )	( )	( )	( )
25. Okra	( )	( )	( )	( )	( )	( )
26. Soybeans	( )	( )	( )	( )	( )	( )
27. Tofu	( )	( )	( )	( )	( )	( )
28. Turnip	( )	( )	( )	( )	( )	( )
29. Yuca	( )	( )	( )	( )	( )	( )
30. Eggplant	( )	( )	( )	( )	( )	( )

31. Would you taste a food that you had never heard of before?

( ) Yes ( ) No ( ) Maybe

WHAT WILL YOU EAT?

This affective measure assesses participants' willingness to try a variety of foods, primarily fruits, vegetables, and grain products. This measure is appropriate for adolescents and preadolescents.

PURPOSE

Information regarding participants' willingness to try a variety of foods may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results of this measure may show that participants are not willing to try a variety of familiar or unfamiliar foods. This would emphasize the need to address the importance of including a variety of foods (especially fruits, vegetables, and grain products) in the diet.
- When this measure is administered prior to and following a program, it is possible to evaluate changes in participants' willingness to try new foods.

PROCEDURES

In most cases, this measure should be administered both at the beginning and end of a program. The measure can, however, be administered at the beginning of a program only for needs assessment purposes as described above.

Handbook users should be alert to concerns regarding the potential reactivity of affective measures. A measure is considered *reactive* if the experience of completing the measure prior to the program causes participants to react differently to the program. Handbook users should, therefore, carefully review each affective measure that they wish to use to determine its potential for making participants unduly sensitive to aspects of the program. If a measure is determined to be reactive, then program personnel should *not* administer that measure to all participants as a pretest and posttest. Instead, the measure could be administered to half of the program participants prior to program participation to determine participants' pre-program status. The measure could then be administered to the other half of the participants after program participation to assess participants' post-program status.

SCORING AND ANALYSIS

This questionnaire can be scored in two ways. One procedure relies on the responses to the question *Have You Tried This?*, providing a group estimate of the variety of foods tried by participants. A second procedure relies on the responses to the question *Would You Try This?,* providing an estimate of participants' willingness to try new foods. Question 31 should be analyzed separately.

Method One: Average number of foods tried by participants

1. Count the number of **Yes** responses to the question *"Have You Tried This?"* for all participants.
2. Divide this total by the *total* number of responses. (When counting the total number of responses, ignore blanks and items marked **Don't Know This Food.**)
3. The resulting score, which may range from 0% (0 foods tried) to 100% (30 foods tried), indicates the average percentage of the 30 foods listed on the measure that were tried by participants. Percentages from before and after the program can be compared to indicate a change in the number of the foods tried by participants.

   EXAMPLE: Suppose that there are 10 program participants. First, add up all the **Yes** *responses to the question "Have you tried this?" Assume the total is 200. Divide this total by the total number of responses from all participants to get an average percentage of the 30 foods tried by participants. Assume the total number of responses is 300. Thus, for this example, participants had tried approximately 67% (or roughly 20 foods) of the 30 foods listed on the measure.*

Method Two: Willingness to try new foods

1. Count the number of **Yes** responses to the question *"Would You Try This?"* for all participants. Next, count the **No** responses and, finally, the **Maybe** responses.
2. Divide each of the three subtotals by the *total* of all responses (i.e., the total of all **Yes, No,** and **Maybe** responses). Do not include blank items when counting the total number of responses. (See above example.)
3. The resulting scores indicate the average percentage of the foods *not previously tried* that participants would (a) try, (b) not try, and (c) consider trying. Percentages from before and after the program can be compared to indicate changes in participants' willingness to try new foods.

Question 31:

Calculate the percentage of participants responding either **Yes, No,** or **Maybe.** Percentages from before and after a program can be compared to indicate changes in participants willingness to taste new foods.

WHAT WILL YOU EAT?

Various foods are listed below. Use a check to show whether you have tried each food. For any foods you have *not* tried, use a check to show whether you would be willing to try those foods. If you have not heard of a food, put a check under DON'T KNOW THIS FOOD.

	Have you tried this?			Would you try this?		
	Yes	No	Don't Know This Food	Yes	No	Maybe
1. Blueberries	( )	( )	( )	( )	( )	( )
2. Honeydew Melon	( )	( )	( )	( )	( )	( )
3. Kiwifruit	( )	( )	( )	( )	( )	( )
4. Cantaloupe	( )	( )	( )	( )	( )	( )
5. Nectarine	( )	( )	( )	( )	( )	( )
6. Apricot	( )	( )	( )	( )	( )	( )
7. Mango	( )	( )	( )	( )	( )	( )
8. Corn Tortillas	( )	( )	( )	( )	( )	( )
9. Brown Rice	( )	( )	( )	( )	( )	( )
10. Whole Wheat Pasta	( )	( )	( )	( )	( )	( )
11. Oatmeal	( )	( )	( )	( )	( )	( )
12. Rye Bread	( )	( )	( )	( )	( )	( )
13. Bagels	( )	( )	( )	( )	( )	( )
14. Broccoli	( )	( )	( )	( )	( )	( )

	Have you tried this?			Would you try this?		
	Yes	No	Don't Know This Food	Yes	No	Maybe
15. Sweet Potatoes	( )	( )	( )	( )	( )	( )
16. Black-eyed Peas	( )	( )	( )	( )	( )	( )
17. Spinach	( )	( )	( )	( )	( )	( )
18. Garbanzo Beans	( )	( )	( )	( )	( )	( )
19. Lentils	( )	( )	( )	( )	( )	( )
20. Lima Beans	( )	( )	( )	( )	( )	( )
21. Pinto Beans	( )	( )	( )	( )	( )	( )
22. Brussels Sprouts	( )	( )	( )	( )	( )	( )
23. Cauliflower	( )	( )	( )	( )	( )	( )
24. Tofu	( )	( )	( )	( )	( )	( )
25. Okra	( )	( )	( )	( )	( )	( )
26. Mushrooms	( )	( )	( )	( )	( )	( )
27. Eggplant	( )	( )	( )	( )	( )	( )
28. Figs	( )	( )	( )	( )	( )	( )
29. Turnips	( )	( )	( )	( )	( )	( )
30. Winter Squash	( )	( )	( )	( )	( )	( )

31. Would you taste a food that you have never heard of before?

( ) Yes ( ) No ( ) Maybe

WOULD YOU MAINTAIN A HEALTHFUL EATING PATTERN?

This affective measure assesses participants' perceived ability to maintain a healthful diet in a variety of situations. The measure is appropriate for adults.

PURPOSE

Information regarding participants' perceived ability to maintain a healthful eating pattern may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results of this measure may indicate that participants have a low perceived ability to maintain a healthful diet in a variety of situations. Thus, participant training in this area could be included in the program.
- When this measure is administered prior to and following a program, it is possible to evaluate growth in participants' perceived ability to maintain a healthful eating pattern.

PROCEDURES

In most cases, this instrument should be administered both at the beginning and the end of a program. However, handbook users should be alert to concerns regarding the potential reactivity of affective measures. A measure is considered *reactive* if the experience of completing the measure prior to the program causes participants to react differently to the program. Handbook users should, therefore, carefully review each affective measure that they wish to use to determine its potential for making participants unduly sensitive to aspects of the program. If a measure is determined to be reactive, then program personnel should *not* administer that measure to all participants as a pretest and posttest. Instead, the measure could be administered to half of the program participants prior to program participation to determine participants' pre-program status. The measure could then be administered to the other half of the participants after program participation to assess participants' post-program status.

SCORING AND ANALYSIS

Point values are assigned to responses as follows:

Definitely Yes	=	5
Probably Yes	=	4
Maybe	=	3
Probably No	=	2
Definitely No	=	1

This measure can be scored by adding the point values of the responses from all participants and dividing this total by the number of responses. Blank items should not be counted in the number of responses. The maximum attainable score of 5 points indicates a strong perceived ability to maintain a healthful eating pattern. A minimum score of 1 indicates little perceived ability to maintain a healthful eating pattern.

WOULD YOU MAINTAIN A HEALTHFUL EATING PATTERN?

Certain situations make it hard to eat healthful foods. For each question below, check one answer to show whether or not you would be able to maintain a healthful eating pattern.

Will you be able to maintain a healthful eating pattern even if . . .	Definitely Yes	Probably Yes	Maybe	Probably No	Definitely No
1. you are eating in a restaurant?	( )	( )	( )	( )	( )
2. you have no time to plan and prepare meals?	( )	( )	( )	( )	( )
3. you are depressed or upset?	( )	( )	( )	( )	( )
4. you are under a lot of pressure?	( )	( )	( )	( )	( )
5. you are feeling nervous?	( )	( )	( )	( )	( )
6. you are bored?	( )	( )	( )	( )	( )
7. you are on vacation?	( )	( )	( )	( )	( )
8. there are a lot of "junk foods" in the house?	( )	( )	( )	( )	( )
9. you have not eaten all day and you are starving?	( )	( )	( )	( )	( )
10. you crave unhealthful foods, such as chocolate?	( )	( )	( )	( )	( )

MAINTAINING A HEALTHFUL EATING PATTERN

This affective measure assesses participants' intention to maintain a healthful eating pattern in the future. This measure is appropriate for adults.

PURPOSE

Information regarding participants' intention to maintain a healthful eating pattern may be useful for the following reasons:

- Administration of this measure at the beginning of a program may provide needs assessment information. For example, results of this measure may indicate that examinees' intention to maintain a healthful diet is weak, thus emphasizing the need for instruction regarding the benefits of a healthful eating pattern.
- When this measure is administered prior to and following a program, it is possible to evaluate changes in participants' intention to maintain a healthful eating pattern.

PROCEDURES

In most cases, this instrument should be administered both at the beginning and end of a program. However, handbook users should be alert to concerns regarding the potential reactivity of affective measures. A measure is considered *reactive* if the experience of completing the measure prior to the program causes participants to react differently to the program. Handbook users should, therefore, carefully review each affective measure that they wish to use to determine its potential for making participants unduly sensitive to aspects of the program. If a measure is determined to be reactive, then program personnel should *not* administer that measure to *all* participants as a pretest and posttest. Instead, the measure could be administered to half of the program participants prior to program participation to determine participants' preprogram status. The measure could then be administered to the other half of the participants after program participation to assess participants' post-program status.

SCORING AND ANALYSIS

Point values are assigned to responses as follows:

Definitely Yes	=	5
Probably Yes	=	4
Maybe	=	3
Probably No	=	2
Definitely No	=	1

This measure should be scored for each of the three time frames (month, year, rest of life) covered by the measure. Add the point values of the responses from all participants separately for each of the three items. Next, divide the total score for each item by the number of responses contributing to that total. Blank items should not be counted in the number of responses. The maximum attainable score of 5 points indicates a strong intention to maintain a healthful diet for the indicated time frame. A minimum score of 1 indicates little intention to maintain a healthful eating pattern.

MAINTAINING A HEALTHFUL EATING PATTERN

The questions below ask about your plans to maintain a healthful eating pattern. A healthful eating pattern provides all recommended nutrients through a variety of foods and is limited in fat, sugar, sodium, and alcohol. Check one answer for each question.

		Definitely Yes	Probably Yes	Maybe	Probably No	Definitely No
( )	1. Are you going to maintain a healthful eating pattern for the next month?	( )	( )	( )	( )	
( )	2. Are you going to maintain a healthful eating pattern for the next year?	( )	( )	( )	( )	
( )	3. Are you going to maintain a healthful eating pattern for the rest of your life?	( )	( )	( )	( )	

CHAPTER FOUR

Locally Conducted Psychometric Studies

Locally Conducted Psychometric Studies

As described in Chapter One, the first step in using the newly developed handbook measures to examine program effectiveness is to select those that match program goals. However, evaluators cannot assume that a measure that appears to assess a desired program outcome will produce valid data about that outcome. When evaluators use a measure, they first want to determine the technical quality of that measure to ensure that any conclusions drawn about a program's effects are warranted. The purpose of this chapter is to assist evaluators in conducting validation studies for those handbook measures chosen for use in program evaluation.

Determining the Technical Quality of Measuring Devices

The degree to which a measuring instrument yields scores from which one can make legitimate inferences is referred to as validity. Tests are not valid or invalid. Rather, it is the inferences made, based on test results, that are valid or invalid. It is, therefore, technically accurate to focus on the *validity of score-based inferences* rather than the validity of a particular measuring device.

The concept of validity is highly dependent on the particular way in which a measuring instrument will be used. For example, a measure of the knowledge of safe food preparation techniques may permit a valid inference regarding the *number* of different techniques with which program participants are familiar, but may yield invalid inferences regarding the *frequency* with which participants use such techniques. Furthermore, a test may yield valid inferences for a particular purpose with one population but invalid inferences for the same purpose with a different population. Thus, because validity varies on the basis of purpose and population, it is most appropriate to examine validity in the setting in which a measure will be used.

A second factor in determining the technical quality of a measurement instrument deals with the extent to which the instrument produces reliable, that is, consistent, results. Because the newly developed handbook measures have been subjected only to small-scale field tests, no reliability data are currently available. It is hoped that handbook users will conduct their own reliability studies and share those results with the Centers for Disease Control. In this way, results can be compiled over time and, subsequently, provided to handbook users. Procedures for evaluating the reliability of the handbook measures will be presented following the discussion of local validation approaches.

Categories of Validity Evidence

There are three major types of evidence regarding validity. These include content-related evidence of validity, criterion-related evidence of validity, and construct-related evidence of validity. The procedures for securing each type of validity evidence will be described below.

Content-related evidence of validity. Content-related evidence of validity involves the careful review of a measure's content by individuals identified as experts in the content area being assessed. This type of validity evidence is particularly important for measures

designed to assess examinees' knowledge and skills. To secure positive content-related validity, the measure must include only those items that correspond to the content area being assessed, and its items must address all important facets of that content area. The systematic, expertise-rooted procedures used to develop the handbook's instruments helped to ensure that appropriate content was built into the measures. Subsequent reviews by external experts confirmed that the measures are, indeed, focused on suitable content. These development procedures and the role of expert advisors in the project are described in the handbook's preface.

If there are questions regarding the suitability of the content in any of the handbook's measures, content-related validity can be examined by assembling a panel of experts who can judge the suitability of a measure's content for the specific program evaluation purpose for which the measure is to be used. A panel of approximately 10 knowledgeable individuals can be asked to review the measuring instrument's items, one by one, and render independent yes/no judgments regarding the appropriateness of each item's content (in relationship to the inference that the program evaluators wish to make on the basis of the measure). In addition, panelists can be asked to determine whether any important content has been omitted from the measure. For example, if a knowledge measure such as **Facts About Vitamin and Mineral Supplements** is being reviewed, panelists might be asked first to think of all the important facts about vitamin and mineral supplements that program participants must know, then to indicate the percentage of those facts that are present in the measure being reviewed. This straightforward indication of a measure's content representativeness, when coupled with judgments regarding the content appropriateness of a measure's items, can yield important content-related evidence of validity for a measure.*

Criterion-related evidence of validity. Criterion-related evidence of validity requires that a measure be checked against an independent criterion. The independent criterion or standard should be one that the measure would be expected to predict. Criterion-related validity is most important for the handbook measures in the areas of behavior and intention. In the area of behavioral self-reports, for example, criterion-related validity would focus on the degree to which the self-reports reflect actual behavior. So, for example, criterion-related validity for a self-report instrument designed to measure modifications in one's eating behavior would be secured by correlating responses on this instrument with observations (by others) of the extent to which the modifications were *actually* being made.

External criterion measures, such as observations, while often more accurate measures of behavior than self-reports, are extremely costly and time consuming to use. Thus, although it may be possible to use such criterion measures in a one-time validity study, they typically will not eliminate the need for self-report instruments in routine program evaluations. The general procedure for conducting a criterion-related validity study is shown in Figure 4.1.

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* For additional information regarding how to conduct content-related validation studies, see Annotated Bibliography Nos. 18, 23, 27, and 34.

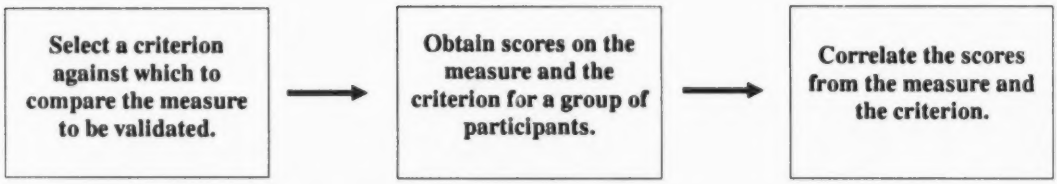
Select a criterion against which to compare the measure to be validated.
Obtain scores on the measure and the criterion for a group of participants.
Correlate the scores from the measure and the criterion.

Figure 4.1: Procedure for conducting criterion-related validity studies

A correlation of approximately .50 or higher between the measure and criterion would indicate that the new measure is predictive of the external criterion measure and, therefore, is measuring what it is intended to measure. A low correlation would call into question the self-report instrument as a measure of the behavior of interest.

Each criterion-related validity study must be specifically designed for the particular measure being examined and the purpose for which the measures will be used. For example, imagine that an evaluator wanted to examine the criterion-related evidence of validity for the handbook's measure entitled **Maintaining a Healthful Eating Pattern**. The evaluator must first identify an appropriate criterion measure. How is a program evaluator likely to use an intention measure? The most likely use would be to employ it as a proxy measure foreshadowing a program's effect on the future behavior of participants. That is, will program participants continue to maintain a healthful eating pattern in the future? Thus, an appropriate criterion measure might be the reported adherence to a healthful diet several months following the program.

To assemble criterion-related evidence of validity for the intention measure, a program evaluator could administer the intention measure at the end of the program to a group of at least 30 participants (or repeat this process each session until responses from at least 30 participants are obtained) and obtain completed self-report surveys several months later regarding participants' adherence to a healthful eating pattern. Once both measures are collected for every individual, a correlation could be computed between the strength of intention for following a healthful eating pattern and whether the healthful eating pattern was being followed subsequent to the program. Thus, the criterion-related validity study would examine whether the intention measure was, in fact, predictive of later behavior. A measure that can serve as a meaningful proxy for participants' future behavior can prove highly useful in the evaluation of a program's impact on participants.*

Construct-related evidence of validity. The final type of validity evidence to be reviewed, construct-related evidence of validity, is particularly important for those handbook measures that do not have a clear criterion measure against which they can be evaluated. Such measures include the attitudinal and affective measures such as **Would You Maintain**

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* For additional information regarding the design and analysis of criterion-related validity studies, see Annotated Bibliography Nos. 18, 23, 27, and 34.

A Healthful Eating Pattern?, a measure that examines an individual's perceived ability to maintain a healthful eating pattern in a variety of situations. Construct-related validity involves the gradual accumulation of data regarding what a test measures. Three strategies are customarily used to secure construct-related evidence of validity for a measure. First, in the *related-measures strategy*, predictions can be tested about the extent to which the measure of interest is correlated with other measures. For example, perceived ability to maintain a healthful diet should be positively related to other measures aimed at assessing a similar attribute but should show reduced correlations with measures tapping different attitudinal dimensions. Thus, other existing measures can be correlated with the measure of interest to help clarify what is being measured.

If the correlations are consistent with the prior predictions, then construct-related evidence of validity has been obtained to support the defensibility of inferences based on the measure's use. Figure 4.2 illustrates the anticipated correlations between the measure of interest and other similar and dissimilar measures.

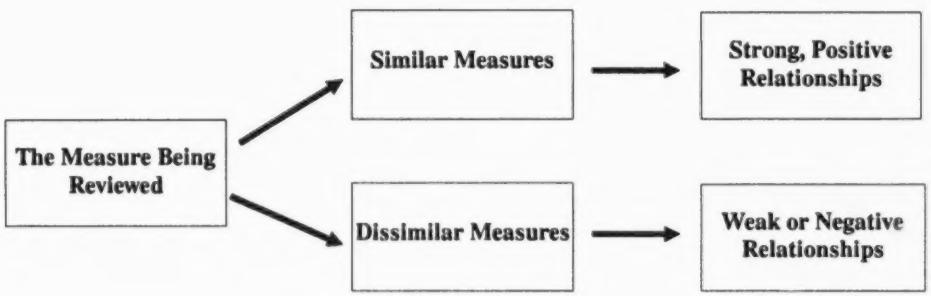

Figure 4.2: Correlations between measures assessing similar/dissimilar attitudinal dimensions

A second approach to examining construct-related validity involves predictions about group differences and is referred to as a *differential-populations strategy*. For this procedure, two or more groups are identified that are expected, based on other characteristics, to perform differently on the measure of interest. For example, the two groups might consist of individuals who are registered dietitians versus those who are not. If the anticipated performance difference between the two groups is not obtained, it would call into question whether the test was measuring what it was thought to measure.

A third strategy for securing construct-related evidence of validity is referred to as an *intervention strategy* because it involves the use of interventions such as training programs. For instance, a measure examined via this strategy could be administered to a group of participants before and after a "proven" nutrition program. If a difference in participants' scores on the measure is not observed, then the construct-related evidence of validity regarding the measure being reviewed is not supportive of the measure's use.

Construct-related evidence of validity is never based on a single study. Instead, consideration of a variety of studies, employing multiple validation strategies such as those

described here, will help provide greater and greater clarification regarding the appropriateness of using a given measuring instrument.*

Types of Reliability

A second characteristic of a defensible measurement instrument is the reliability or consistency with which it measures. The reliability of a test can be examined in three distinct ways. These include test-retest reliability, alternate-forms reliability, and internal consistency. Each of these approaches will be described below.

Test-retest reliability. Test-retest reliability (also referred to as *stability* reliability) examines the extent to which a measurement instrument is consistent over testing occasions. That is, will an individual who received a particular score on one testing occasion receive a similar score on a different testing occasion? Typically, to secure test-retest reliability information, an instrument is administered once to a group of individuals (30 or more). The same instrument is administered again under similar conditions to the same group of individuals approximately two to four weeks later. Individuals' scores from the two administrations are then correlated. The higher the correlation, the greater the stability of measurement over time. Short tests, or other tests that are likely to be easily remembered, may result in an overestimate of reliability if participants recall their answers and, hence, respond similarly on the second testing occasion.

Alternate-forms reliability. The knowledge and skill measures in this handbook have two forms that may be used for a pretest to posttest comparison. The administration of one form for the pretest and the other form for the posttest is desirable because the pretest may sensitize participants to pay more attention to those issues included on the pretest than to other equally important issues. However, to draw defensible conclusions based on the use of two different forms at pretest and posttest, the forms must be equivalent.

To examine alternate-forms reliability it is necessary to administer both forms to the same group of individuals. The scores from the two forms can then be correlated. High correlations indicate that the same conclusions would be drawn about an individual or group of participants regardless of which of the two forms had been used. Thus, there would be reliable or consistent measurement across alternate forms. A high alternate-forms reliability coefficient does not guarantee that the forms are perfectly equidifficult. If the two forms are not of equal difficulty, that is, participants perform consistently better on one form than the other, it would still be possible to obtain high between-forms correlations. Thus, it is important to be attentive to mean scores on the two test forms. It is also permissible to use p-values (the percentage of examinees getting each item correct) to reassign items to forms so that they are more equidifficult. After the redistribution of items, a second alternate-forms reliability study should be conducted.

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* For additional information regarding how to conduct construct-related validity studies, see Annotated Bibliography Nos. 18, 23, 27, and 34.

Handbook users should not assume equivalence or equidifficulty for the multiple forms provided in this handbook. Until alternate-forms reliability and test difficulty are examined, the measures should be used in a design such that half of the participants take Form A as a pretest and Form B as a posttest while the other half take Form B as a pretest and Form A as a posttest. This counterbalancing technique eliminates the possible influence of one form being more difficult than the other.

Internal consistency. Internal consistency examines the extent to which the instrument measures a single or related set of constructs. The higher the internal consistency, the greater the homogeneity of items on the test. A test thought to measure a single attitudinal dimension should have relatively high internal consistency reliability. Procedures for calculating internal consistency include split-half reliability, Kuder-Richardson formulas, and Cronbach's Alpha. The split-half reliability coefficient is calculated by administering the test to a group of at least 30 participants and then correlating scores from the odd versus the even items. A correction for test length must then be made using the Spearman-Brown formula. The split-half procedure is very similar to alternate-forms reliability in that two "forms" are correlated by separating the odd and even items. Kuder-Richardson formulas for internal consistency provide an estimate of the average of all possible split-halves. Kuder-Richardson formulas, like Spearman-Brown, require that test items be binary-scored, that is, able to be scored as right or wrong. Cronbach's Alpha is identical to Kuder-Richardson for binary-scored items but can also be used for items that yield responses to which several points can be assigned, such as the items on **Would You Maintain A Healthful Eating Pattern?**

Not all forms of reliability need to be computed for every test. For example, alternate-forms reliability would be computed only for those measures that have two forms. Internal consistency estimates are less appropriate for multidimensional measures. Test-retest reliability is appropriate for most measures but often presents pragmatic problems due to the need to retest the same individuals.*

Groups and Individuals

The validity and reliability procedures reviewed here were originally developed to examine the quality of tests used for *individual* assessment purposes. In contrast, the recommended use for the handbook measures is to perform *group* analyses for program evaluation. Thus, the appropriate reliability issue is whether scores for a group of individuals are relatively consistent. Similarly, the validity issue is whether changes in scores for a group of individuals are reflective of changes in the group's knowledge, skills, affect, or behavior. Because group scores are more stable than individual scores, the procedures outlined above are likely to underestimate the reliability and validity of the measures when used for program evaluation. Practically speaking, a measurement instrument with a lower reliability or validity coefficient would be acceptable when used for group rather than individual

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* For additional information regarding how to examine the reliability of measurement instruments, see Annotated Bibliography Nos. 3, 18, 19, 23, 27, and 34.

diagnosis. For example, Salvia and Ysseldyke (1981, p. 98) have recommended the following minimum standards for alternate-forms reliability:

.60 - when scores are reported for groups
.80 - when scores are used for individual screening
.90 - when scores are used for important educational decisions for individuals

Thus, standards for acceptable reliability and validity vary depending on the purpose for using a particular measure. However, minimal levels for each are critical for making sound decisions about a program. With a little creativity and effort, studies of reliability and validity can often be integrated into the ongoing operation of a program.

In addition to providing a brief overview, the major purpose of this chapter was to encourage handbook users to conduct local reliability and validity studies and to consider the involvement of a measurement specialist or the use of appropriate references in designing such studies. As suggested at the outset of the chapter, if such local studies are carried out, results should be forwarded to the Centers for Disease Control (Attention: Dr. Diane Orenstein, Project Officer, Center for Health Promotion and Education, Centers for Disease Control, 1600 Clifton Road N.E., Atlanta, GA 30333). This information will be shared with future handbook users.

Appendices

Appendix A

AMPLIFIED CONTENT DESCRIPTORS*

FOODS AND THE DIETARY GUIDELINES
(Adult Measure)

SELECTING FOODS FOR YOUR HEALTH
(Adolescent/Preadolescent Measure)

General Information

1. The *Dietary Guidelines for Americans* provide recommendations to help people improve their eating patterns.
2. The *Dietary Guidelines* apply to healthy people, not to people who must follow special diets because of diseases or conditions that interfere with normal nutritional requirements.
3. The *Dietary Guidelines* are as follows: (a) eat a variety of foods; (b) maintain desirable weight; (c) avoid too much fat, saturated fat, and cholesterol; (d) eat foods with adequate starch and fiber; (e) avoid too much sugar; (f) avoid too much sodium; and (g) if you drink alcoholic beverages, do so in moderation.
4. Following the *Dietary Guidelines* will not guarantee health and well-being.
5. People can reduce their chances of getting certain chronic diseases, such as coronary heart disease or type II diabetes, by changing their eating patterns.

Dietary Guideline - Eat a Variety of Foods

6. The body needs nutrients in order to build, repair, and maintain itself.
7. All nutrients are available from food.
8. Most foods contain more than one nutrient.
9. No one food supplies all the essential nutrients that a person needs in order to meet the Recommended Dietary Allowances (RDA).
10. A person needs to eat a variety of foods in order to meet the RDA standards.
11. The greater the variety of foods a person eats, the less risk there is of developing an excess or a deficiency of any one nutrient.

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* These amplified content descriptors are not exhaustive accounts of nutrition content.

12. One way to assure variety in the diet is to select foods each day from each of the major food groups including fruits; vegetables; grains, breads, and cereals; milk products; and meats and meat alternates.
13. A second way to assure variety in the diet is to select different foods from within each food group.

Dietary Guideline - Maintain Desirable Weight

14. Body weight is determined by an individual's activity level and that person's food consumption.
15. Body composition is often expressed as the amount of body fat in comparison to the percentage of all other tissues (muscles, bones, and nerves).
16. Obesity is defined as the condition of being 20 percent over ideal body weight.
17. Excess body fat is associated with high blood pressure, increased levels of blood fats (triglycerides) and cholesterol, cardiovascular disease, type II diabetes, and certain cancers.
18. Body composition may be changed by altering the amount of exercise and/or changing the amount and/or type of food consumed.
19. Recent research shows that people who tend to have fat concentrated in the waist and abdomen rather than the thighs and buttocks may be more prone to the diseases that are associated with obesity.
20. The amount of energy required by the body during sleep, periods of rest, and for such functions as breathing is often referred to as the resting energy requirement.
21. About two-thirds of the energy that a person needs is used to meet the body's resting energy requirement.
22. Energy is required for any physical activity such as walking, running, or swimming.
23. An individual's total energy need is the sum of that person's resting energy requirement plus the total amount of energy used in physical activities.
24. Energy is measured in units called calories.
25. Vitamins and minerals do not supply calories.
26. The average number of calories required by an individual depends upon that person's physical activity level, body size, age, and sex.
27. Individuals must adjust calorie intake throughout their lives because resting energy and physical activity requirements change.
28. If people consume more calories than their bodies need, the excess calories will be stored by their bodies in the form of fat.
29. People can reduce body fat and weight by consuming fewer calories than their bodies need.
30. Increasing the number of calories used through exercise and making no changes in the number of calories consumed will generally result in weight loss.

31. Maintaining a constant exercise pattern and decreasing the number of calories consumed will generally result in weight loss.
32. Increasing the number of calories used through exercise and decreasing the number of calories consumed will generally result in weight loss.
33. At the beginning of a weight-reduction diet, much of the weight loss is due to water loss.
34. For most who decide to lose weight, a steady loss of one to two pounds a week until the goal weight is reached is safe.
35. Fad diets promising "quick" weight loss should be avoided because they can be harmful to an individual's health.
36. Diets containing fewer than 800 calories may be hazardous and should be followed only under medical supervision.
37. Frequent vomiting and purging can cause chemical imbalance that can lead to irregular heartbeats and even death.
38. Frequent vomiting can erode tooth enamel.
39. Severe weight loss may be associated with nutrient deficiencies, menstrual irregularities, infertility, hair loss, skin changes, cold intolerance, severe constipation, psychiatric disturbances, and other complications.

Dietary Guideline - Avoid Too Much Fat

40. Currently, the recommendation for safe, adequate fat intake is that no more than 30 percent of a person's recommended daily calorie intake should come from fat.
41. Each gram of fat supplies about nine calories, compared with about four calories per gram of protein or carbohydrate, and seven calories per gram of alcohol.
42. Saturated fatty acids are found in largest proportions in fats of animal origin, such as meats and dairy products.
43. Saturated fatty acids are also found in some vegetable oils, including coconut and palm kernal oils.
44. Monounsaturated fatty acids are found in fats of both plant and animal sources.
45. Olive and peanut oils are the most common examples of fat with mostly monounsaturated fatty acids.
46. Polyunsaturated fatty acids are found in largest proportions in fats of plant origin, such as corn (corn oil).
47. Cholesterol is made by the body and also found in animal sources, such as egg yolks, meats, and dairy products.
48. Cholesterol is not found in foods of plant origin such as fruits, vegetables, grains, nuts, seeds, and dry beans and peas.
49. One way to reduce cholesterol in the diet is to eat fewer animal foods and more plant foods.

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50. Foods that are low in cholesterol are not necessarily low in fat.
51. Some foods that are low in fat include all vegetables and fruits (except avocados and olives), breads, cereals, pasta products, rice, skim milk, low-fat cottage cheese, low-fat yogurt, ice milk, frozen yogurt, chicken, turkey, fish, dried beans and peas, and tofu.
52. Some foods that are high in fat include butter; margarine; shortening and cooking oils; coconut oil; baked goods such as cakes, cookies, and pies; fried foods; fish sticks; chocolate; mayonnaise; salad dressings; gravies; beef; lamb; pork; bacon; ham; sausage; duck; nuts; nut butters; seeds; chips; hard and soft cheeses; ice cream; whole milk; avocadoes; olives; pizza; sour cream; and cream.
53. Gourmet ice creams generally contain more fat than less expensive brands of ice cream.
54. Ice cream contains more fat than ice milk and frozen yogurt.
55. Chicken nuggets contain more fat than a plain hamburger.
56. Some cheeses, such as Mozzarella, contain less fat than other cheeses, such as Cheddar.
57. One way people can lower the amount of saturated fat in their diets is to use margarine instead of butter.
58. Eating too much saturated fat, high levels of cholesterol, and excess calories will increase blood cholesterol in many people.
59. High blood cholesterol is one of several risk factors associated with coronary heart disease.
60. Eating foods that are high in saturated fat increases a person's chance of getting coronary heart disease.
61. Reading product labels will help a person determine the amount and type of fat present in foods.
62. Breading and/or frying foods increases their fat content.
63. Roasting, baking, or broiling meat does not increase the fat content of meat.
64. Trimming excess fat off meat and removing the skin from chicken are excellent ways to reduce the fat content of these foods.

Dietary Guideline - Eat Foods with Adequate Starch and Fiber

65. Starch and most types of dietary fiber are complex carbohydrates.
66. Dietary fiber is a term used to describe parts of plant foods that are generally not digestible by humans.
67. There are several kinds of fiber, such as cellulose and pectin, that have different chemical structures and biological effects.
68. Fiber is helpful in preventing and treating constipation and diverticular disease.

69. It has been suggested that diets high in fiber may reduce the risk of developing colon cancer.

70. Some foods that are high in fiber include fruits and vegetables (especially with edible skins and seeds), whole-grain breads and cereals, whole wheat pasta, brown rice, nuts and seeds, dry beans and peas.

71. Some foods that are low in fiber include milk; fruit juices; cheeses; ice cream; meat, poultry, and fish; all fats, such as butter and salad dressings; soft drinks; alcoholic beverages.

72. Some bread products (e.g., wheat or rye bread) have more fiber than others (e.g., white bread).

73. Some foods that are high in starch include breads; cereals; pasta such as spaghetti and noodles; rice; dried beans and peas; some vegetables such as potatoes, corn, peas, and lima beans.

74. Starchy foods, such as potatoes and rice, do not contain high amounts of fat.

Dietary Guideline - Avoid Too Much Sugar

75. A significant health problem resulting from eating too much sugar is dental caries (i.e., tooth decay).

76. Frequent between-meal snacks of sugary foods may be more harmful to teeth than sugary foods eaten during regular meals.

77. Both starches and sugars appear to increase the risk of tooth decay when eaten between meals.

78. Sugars provide calories but few other nutrients.

79. Corn syrup, dextrose, honey, molasses, maltose, and sorbitol are some of the sugars that are added to foods.

80. Honey has more calories (64 per tablespoon) than white sugar (46 calories per tablespoon), and is not nutritionally superior to sugar.

81. Some foods that have a low sugar content include vegetables, most breads, some cereals, pasta products, rice, milk (except flavored milk), cheese, meats, fish, dried beans and peas.

82. Some foods that are high in sugar include canned fruit in heavy syrup, flavored yogurt, cake, cookies, pie, doughnuts, sweet rolls, candies, non-diet soft drinks, fruit-flavored punches, jam and jelly, and liqueurs.

Dietary Guideline - Avoid Too Much Sodium

83. Sodium intake is one of the factors known to affect high blood pressure.

84. Most Americans get more sodium in their diets than is needed.

85. According to the National Research Council of the National Academy of Sciences, a "safe and adequate" intake of sodium for adults ranges from 1,100 to 3,300 milligrams per day.

86. One teaspoon of table salt, which contains sodium and chloride, contains approximately 2,000 milligrams of sodium.

87. Sodium occurs naturally in many foods.

88. Sodium is often added to foods during processing.

89. Taste is not necessarily a good indicator of the amount of sodium a food contains.

90. Some foods that are relatively low in sodium include fresh and frozen vegetables (cooked without added salt); fruits and fruit juices; milk; yogurt; fresh meats, poultry, and fish; rice; pasta; unprocessed grains; some breads and cereals.

91. Some foods that are relatively high in sodium include some processed breakfast cereals; salted, canned vegetables; vegetable juices; frozen vegetables with sauce; most cheeses; canned poultry and fish; cured and processed meats such as hot dogs, sausage, and luncheon meats; convenience foods such as canned soups, frozen dinners, dehydrated sauce mixes; condiments such as salad dressings, soy sauce, catsup, mustard, tartar sauce, garlic salt, onion salt, pickles, and olives; snack foods such as chips, pretzels, salted nuts.

Dietary Guideline - If You Drink Alcoholic Beverages, Do So in Moderation

92. Alcoholic beverages are high in calories and low in nutrients.

93. Heavy drinkers frequently develop nutritional deficiencies as well as other diseases, such as cirrhosis of the liver and certain types of cancer.

94. Women who drink alcoholic beverages during pregnancy increase the chances that their babies will have birth defects.

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NUTRITION AND THE LIFECYCLE
(Adult/Older Adolescent Measure)

Nutrition During Pregnancy

1. Most physicians currently recommend that women gain between 24 to 30 pounds during their pregnancies.
2. During pregnancy, women need (on average) 300 more calories each day than their normal, nonpregnant energy needs.
3. Pregnancy increases women's need for *all* nutrients, especially protein, calcium, iron, and folacin.
4. Women who are pregnant need to increase their protein intake by approximately 30 grams per day over the recommended amount for nonpregnant women.
5. Women who are pregnant need to increase their consumption of iron by at least 100 percent over the RDA for nonpregnant women.
6. During pregnancy, women's need for folic acid (a B-vitamin) doubles.
7. During pregnancy, the need for calcium increases by 50 percent of the RDA for nonpregnant women.
8. Teenagers who are pregnant or nursing need at least four cups of milk products each day.
9. Women over 20 who are pregnant or nursing need at least three cups of milk products each day.
10. Physicians commonly prescribe vitamin and mineral supplements for pregnant women.
11. Research shows that excessive alcohol consumption during pregnancy can cause birth defects.
12. Research shows that women who are heavy smokers have lower birth-weight babies than women who do not smoke.
13. Women who are overweight before becoming pregnant should not try to lose weight during their pregnancies.

Nutrition During Infancy

14. Babies grow faster during their first year of life than at any other time during their lives.
15. Infants need more energy, proportionate to their weight, during the first six months than they will during the rest of their lives.
16. Cow's milk should *not* be given to infants who are under six months old.
17. When cow's milk is used during the first year, it should always be whole milk, not skim or low-fat milk.
18. Solid foods can be introduced once infants are from ages four to six months.

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19. Infants and children ages six months to three years need more iron than older children.

Nutrition During Childhood

20. After the first year, children's growth rate slows, and children will gain about five pounds each year until they enter adolescence.
21. The appetites of toddlers (ages one to two) and preschoolers (ages three to five) decrease after the first year.
22. Healthy children adjust their eating patterns to meet their energy needs.
23. Serving sizes for young children will generally be smaller than those for adults.
24. Children under 10 years old need the equivalent of two cups of milk each day.
25. Children between the ages of 11 and 18 need three servings of milk products each day.
26. School-age children (six years to onset of puberty) need the same number of servings (two to three) of meat or protein foods as adults.
27. Most school-age children do not need to take vitamin and mineral supplements.

Nutrition During Adolescence

28. The need for most nutrients increases during an adolescent's "growth spurt."
29. Adolescent boys need more energy than adolescent girls during their growth period.
30. Teenagers need at least three servings of milk products each day.
31. Teenagers need more calcium than children under age 11.
32. Teenage girls who menstruate need more iron than teenage girls who have not started menstruating.
33. Teenage boys need more iron during their growth period than following their growth period.
34. Many teenage girls do not get adequate amounts of certain minerals, such as calcium.
35. Severely limiting caloric intake during adolescence may interfere with subsequent growth.
36. Teenage athletes generally do not need to increase their intake of protein, vitamins, or minerals above that specified in the RDA.

Nutrition During Adulthood

37. Energy needs begin to decrease by about two percent every 10 years after age 23.
38. Most older adults need fewer calories than younger adults.
39. Adult women's need for iron decreases after menopause.
40. Calcium intake of older adults, especially women, tends to be low.

41. Adults need at least two servings of milk products each day.
42. Many older adults do not get enough fiber in their diets.
43. All adults should eat two to three servings of meat or protein foods each day.

Recommended Eating Pattern

44. Nutritional needs vary depending on age, sex, body build, and physical activity.
45. Most people should eat at least four to five servings of fruit and vegetables each day.
46. Most people should eat at least two to three servings of meat or protein foods each day.
47. The recommended number of servings of milk products varies throughout the stages of the lifecycle (see earlier sections for recommended servings).

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FACTS ABOUT VITAMIN AND MINERAL SUPPLEMENTS
(Adult Measure)

FACTS ABOUT TAKING VITAMINS AND MINERALS
(Adolescent/Preadolescent Measure)

General Information

1. Vitamins and minerals do not contribute energy to a person's diet, although they may help in the release of energy from other nutrients.
2. The Recommended Dietary Allowances (RDA) are the amounts of various nutrients that are recommended in order to meet the needs of nearly all healthy individuals in the American population.
3. An individual's RDA requirements depend upon that individual's age, sex, and health status.
4. The RDA are reviewed and updated at regular intervals as better scientific information becomes available.
5. The best way to meet the RDA is to eat a variety of foods rather than to take nutrient supplements.
6. The greater the variety of foods a person eats, the less risk there is of developing an excess or a deficiency of any one nutrient.
7. An extra supply of one nutrient cannot make up for a shortage of another nutrient.
8. The diets of most Americans supply the necessary amounts of the major vitamins and minerals.
9. For healthy individuals, there are no known advantages to consuming any nutrient in amounts greater than suggested in the RDA.
10. Healthy people who take supplements should limit supplement potency to 100 percent or less of the RDA for their age and sex.
11. Vitamin and mineral supplements are not a "quick fix" for poor food choices because supplements do not provide all the components of foods.
12. Individual recommendations regarding supplements and diets should come from registered dietitians and/or physicians.
13. Vitamin and mineral supplements are readily available in doses much greater than the RDA.
14. "Natural" supplements are no better for the body than chemically synthesized supplements.

The Need for Supplements

15. Women with heavy menstrual bleeding may need to take iron supplements.
16. Women who are pregnant or breastfeeding need more of certain nutrients, especially iron, calcium, and folic acid.

17. People who follow very low calorie diets may not meet their needs for all nutrients.
18. Some vegetarians, especially *vegans* (vegetarians who eat no animal products), may not get adequate amounts of certain nutrients such as calcium, iron, zinc, and vitamin B-12.
19. Individuals whose nutrient needs are altered by certain diseases, disorders, and/or medications may need to take nutrient supplements.
20. Older, inactive people are more likely to need vitamin and mineral supplements than young adults.
21. Emotional stress does *not* increase nutrient needs.
22. Smoking increases the body's need for vitamin C slightly; however, smoking is not likely to increase the need for nutrients above 100 percent of the RDA.
23. Alcohol can interfere with the body's absorption of a variety of nutrients; however, drinking in moderation is not likely to increase individuals' needs for nutrients above 100 percent of the RDA.
24. Competitive athletes and people who engage in regular exercise generally do *not* need vitamins and minerals in excess of the RDA.

The Effects of Taking Supplements

25. Currently, there is little scientific evidence that vitamin and mineral supplements will prevent cancer, colds, osteoporosis, premenstrual syndrome, or heart disease.
26. Currently, there is little scientific evidence that taking fish oil supplements will prevent heart disease.
27. The health risks associated with the intake of a daily multivitamin and mineral supplement that does not exceed the RDA are minimal.
28. High-dose, single nutrient supplements will not necessarily promote good health or prevent disease.
29. Large doses of either single nutrient supplements or high potency vitamin and mineral combinations may be toxic.
30. High-dose vitamin and mineral supplements can interfere with the metabolism of other nutrients and with the therapeutic effects of certain drugs (e.g., high doses of calcium can interfere with iron absorption).
31. Safe intake levels of nutrients vary widely from nutrient to nutrient and may vary with the age and health of an individual.
32. High doses of certain fat-soluble vitamins (e.g., A and D) or water-soluble vitamins (e.g., B-6 and C) may cause serious harmful effects.
33. Body size, supplement potency, supplement dose (number and frequency), and length of time the supplement is taken all influence whether a supplement can be toxic.

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SAFETY IN FOOD PREPARATION
(Adult Measure)

PREPARING FOODS SAFELY
(Adolescent/Preadolescent Measure)

General Information

1. Many types of food poisoning can be prevented with proper food preparation and handling techniques.
2. Not all types of bacteria that spoil foods will cause food-bourne illness.
3. Some of the most common illness-causing organisms that contaminate food are salmonella, staphylococcus aureus, clostridium perfringens, clostridium botulinum, campylobacter jejuni, and listeria monocytogenes.

Food Preparation

4. Foods can become contaminated by individuals who sneeze or cough on foods or who do not wash their hands after using the bathroom, diapering a baby, or blowing their noses.
5. Rinsing poultry with cold water will help wash away some of the bacteria (e.g., salmonella) that may be present.
6. Poultry should be cooked until the juices are yellow or clear (an internal temperature of 180° to 185° F) to kill any bacteria that may be present.
7. All utensils (including dishrags and sponges) used in the preparation of raw poultry should be washed thoroughly with hot soapy water to kill any bacteria that may have spread to the utensils.
8. A diluted bleach-water solution should be used to clean counter surfaces and cutting boards following preparation of raw poultry.
9. Pork should be cooked until it is gray or white (an internal temperature of 160° - 170° F) in color.
10. Clams should be steamed for at least four to six minutes to ensure that they are free of illness-causing organisms.
11. The addition of lemon juice, wine, or vinegar to meat-marinades may slow bacterial growth; however, it will *not* prevent such growth.
12. It is risky to marinate (soak) meats at room temperature for more than two hours.
13. Wooden cutting boards are more likely to become contaminated with bacteria than plastic ones.
14. Meat that is raw or undercooked is more likely to cause illness or adverse reactions than meat that is well done.
15. Raw or unpasteurized milk is more likely to be contaminated with bacteria than pasteurized milk.

16. Leaving stuffing inside a turkey after the turkey (and stuffing) have been cooked promotes bacterial growth.
17. Frozen foods should be thawed in a refrigerator rather than at room temperature to keep bacteria from multiplying as rapidly as they would otherwise.

Food Storage

18. It is risky to store yet-to-be cooked or cooked foods at room temperature for more than two hours.
19. Large batches of food should be divided into small batches so that, once in a refrigerator, the food will cool quickly.
20. Foods should be cooled in a refrigerator rather than at room temperature to avoid the possibility of food poisoning.
21. Keeping foods at low temperatures on a stove promotes bacterial growth.
22. Refrigerated foods should be kept at temperatures of 40° F or below.
23. Raw poultry and ground beef can be stored safely in a refrigerator for two to three days.
24. It is safe to refreeze meat that has been thawed overnight in a refrigerator.
25. An opened jar of mayonnaise can be stored safely in a refrigerator for up to one year.

Signs of Food Poisoning

26. A bulging can, cracked jar, or a jar with a loose lid could be a sign of contaminated food.
27. Contaminated poultry will not necessarily look different than uncontaminated poultry, and it almost never has a strong odor or bad taste.
28. Raw hamburger meat that has a bad odor should not be eaten.
29. The color of raw hamburger meat (i.e., brown or pink) is a reflection of the amount of oxygen with which it has come into contact.
30. Raw hamburger meat that has turned brown after being stored in a refrigerator for *a day* is, in most cases, safe to eat.
31. The black, crusty ring that often forms around the rim of a jar of mustard or catsup is not a sign of spoilage; it is a result of an interaction of the contents with air.

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EARTH FRIENDS
(Adolescent/Preadolescent Measure)

Basic Concepts

1. An earth friend tries to choose foods that preserve the earth's natural resources.
2. Use of foods grown locally or in nearby states supports regional agriculture and is less energy intensive than use of foods grown in distant states.
3. Out-of-season produce is more energy intensive than seasonal produce.
4. In general, the more a food is processed (i.e., changed from its original form), the more energy is used in producing it and the higher the level of fat, salt, and sugar. (For example, it takes more energy and materials to produce apple granola bars than to produce unsweetened applesauce.)
5. Some foods use more natural resources than others for processing, storing, and packaging (e.g., seasonal fresh fruit uses less resources than canned or frozen fruit).
6. Packages that can be recycled or use fewer materials (e.g., large glass bottles versus six-packs of small tin cans) help save the earth's resources.
7. To help preserve the earth's resources, consumers should choose minimally processed and minimally packaged foods whenever possible.

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Appendix B

INFORMED CONSENT PROCEDURES

Prior to administering measures to participants, program personnel should inform participants about the content covered by the measures and the purpose of the program's evaluation study. Program personnel may also wish to provide the opportunity for participants to indicate whether or not they consent to participate in the study and complete the selected measures. Informed consent is obtained by presenting all information pertinent to the study and asking the participant to affix a signature indicating that the information has been read and that consent is given to participate.

If the decision is made to obtain informed consent, program personnel have the choice of employing a "passive" consent procedure or an "active" consent procedure. *Passive informed consent* consists of asking participants to sign and return a consent form only *if they do not wish to participate* in the study. Participants who do not return the consent form are considered eligible to participate in the study.

Active informed consent requires participants to sign and return the consent form *if they wish to participate*. Only those participants who return a signed form can be included in the study. Consequently, the participation rate resulting from an active consent procedure is generally lower than that obtained from a passive consent procedure.

To construct an informed consent form, program personnel should consider including the following items:

1. A general statement of the program goals and objectives.
2. A brief explanation of the study procedures and measures.
3. An indication that the participant is free to withdraw consent and to discontinue participation at any time.
4. An explanation of the procedures to be taken to ensure anonymity and confidentiality of responses.
5. An indication that participants are free not to answer specific items or questions.
6. A place for the participants to affix their signatures under a statement indicating that the participant agrees to participate (active consent) or does not agree to participate (passive consent) in the study. If appropriate, a date for the return of the consent form should be specified.

Appendix C

ANNOTATED EVALUATION BIBLIOGRAPHY

1. Alkin, M.C., & Solmon, L.C. (Eds.). (1983). *The costs of evaluation*. Beverly Hills, CA: Sage.

   In this collection of essays both theoretical and practical issues relevant to cost-focused program evaluations are presented.

2. American Psychological Association. (1973). *Ethical principles in the conduct of research with human participants*. Washington, DC: Author.

   This treatise focuses on the appropriateness of carrying out various types of research investigations with human subjects. Because the American Psychological Association has had a long-standing concern about ethical issues in the conduct of research investigations, this publication will be of interest to numerous evaluators of health education programs.

3. American Psychological Association, American Educational Research Association, National Council on Measurement in Education. (1985). *Standards for educational and psychological tests.* Washington, DC: Author.

   This volume presents the most widely used set of standards for psychological and educational tests. Frequently cited by users of educational tests, the standards have recently been employed in numerous judicial deliberations. Relatively brief, the standards should be consulted by health educators who employ assessment devices regularly.

4. Anderson, L.W. (1981). *Assessing affective characteristics in the schools*. Boston: Allyn and Bacon.

   Anderson provides an excellent set of practical suggestions for the creation of affective assessment instruments. He includes one of the most easily understood expositions of various scaling procedures including Likert, Thurstone, and Guttman scales.

5. Bausell, R.B. (Ed.). *Evaluation and the health professions*. Newbury Park, CA: Sage.

   This quarterly publication deals with a variety of evaluation-relevant issues of interest to health educators.

6. Berk, R.A. (Ed.). (1982). *Handbook of methods for detecting test bias*. Baltimore: The Johns Hopkins University Press.

   This collection of individual essays offers the reader a comprehensive depiction of methods currently available to detect the presence of bias in tests.

7. Berk, R.A. (Ed.). (1984). *A guide to criterion-referenced test construction*. Baltimore: The Johns Hopkins University Press.

This collection of essays consists of papers presented at the first Johns Hopkins University National Symposium on Educational Research. In addition, a number of more recently written chapters have been included in this revision of a 1980 text. The authors address many of the important problems, both conceptual and technical, facing developers and users of criterion-referenced measures.

8. Campbell, D.T., & Stanley, J.C. (1966). *Experimental and quasi-experimental designs for research*. Chicago: Rand McNally.

This volume, originally a chapter in a larger volume, has had substantial impact on the fields of research and evaluation. Evaluators of health education programs will wish to consider this truly classic treatment of data-gathering designs suitable for experimental and quasi-experimental settings.

9. Churchill, G.A., Jr. (1979). *Marketing research: Methodological foundations* (2nd ed.). Hinsdale, IL: The Dryden Press.

Although written in the context of marketing research, this textbook covers several topics of vital importance in evaluation. Topics such as research design, data collection, sampling, and data analysis are covered in a readily understandable yet accurate way. An excellent resource.

10. Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (rev. ed.). New York: Academic Press.

Cohen offers a useful treatment of factors which should be considered when one draws samples for use in research or evaluation activities. Of special interest is the set of easy-to-use guidelines he offers for determining the estimated sample size necessary to detect differences between groups.

11. Cook, T.D., & Campbell, D.T. (1976). The design and conduct of quasi-experiments and true experiments in field settings. In M.D. Dunnette (Ed.), *Handbook of industrial and organizational psychology*. Chicago: Rand McNally.

This is an updated version of the famous exposition of quasi-experimental and experimental data-gathering designs by Donald T. Campbell and Julian C. Stanley (see Reference No. 8). An excellent discussion of four types of validity is featured in this essay.

12. Cook, T.D., & Campbell, D.T. (1979). *Quasi-experimentation: Design and analysis issues for field settings*. Chicago: Rand McNally.

This widely cited volume provides a comprehensive treatment of quasi-experimental investigations in settings of substantial relevance to the concerns of health educators. There are excellent discussions of internal and external validity, including the various threats to both types of validity. A systematic consideration of the commonly used data-gathering designs is offered, including an extended appraisal of interrupted time-series designs.

13. Cordray, D.S., Bloom, H.S., & Light, R.J. (Eds.). (1987, Summer). *Evaluation practice in review* (New Directions for Program Evaluation, No. 34). San Francisco: Jossey-Bass.

This volume contains a set of thought-provoking chapters dealing with what has been learned about the practice of evaluation during the past decade. The chapters on evaluation politics by Eleanor Chelimsky and on naturalistic evaluation by Egon Guba would be of particular interest to evaluators of health education programs.

14. Cronbach, L.J. (1963). Course improvement through evaluation. *Teachers College Record, 64*, 672-683.

This article is an early piece, presenting the virtues of what would later be termed "formative" evaluation. It rings as true today as it did more than two decades ago, and it applies as much to evaluation in health education as it does to more traditional evaluation. Emphasizing the role of evaluation in gathering information that can improve programs, this article is well worth reading.

15. Cronbach, L.J. (1977). *Analysis of covariance in nonrandomized experiments: Parameters affecting bias.* Unpublished occasional paper, Stanford Evaluation Consortium, Stanford University.

A highly technical piece on the complications associated with using analysis of covariance, this article is recommended only for those prepared to handle a critical data-analysis problem in a sophisticated way.

16. Cronbach, L.J., Ambron, S.R., Dornbusch, S.M., Hess, R.D., Hornik, R.C., Phillips, D.C., Walker, D.F., & Weiner, S.S. (1980). *Toward reform of program evaluation.* San Francisco: Jossey-Bass.

This important book considers the function of evaluation in a pluralistic society and presents 95 theses on the role of evaluators and evaluations. In addition to providing a contemporary conception of evaluation, it provides a historical and multidisciplinary perspective of the field. This volume will be of considerable interest to those evaluating health education programs.

17. Cronbach, L.J., & Furby, L. (1970). How should we measure 'change' – or should we? *Psychological Bulletin, 74*, 68-80.

A technical treatise on the dangers associated with using gain scores. A very significant piece, but recommended only for those with some psychometric training.

18. Cunningham, G.K. (1986). *Educational and psychological measurement.* New York: Macmillan.

This is a standard introductory text focusing on the major topics associated with measurement as it applies to such tasks as program evaluation.

19. Ebel, R.L. (1979). *Essentials of educational measurement* (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

This is a standard, easily read introductory text, covering important topics in the field of educational testing. Ebel, a prominent leader of traditional educational testing practices, provides a lucid treatment of a wide range of measurement topics.

20. Fetterman, D.M., & Pitman, M.A. (Eds.). (1986). *Educational evaluation: Ethnography in theory, practice, and politics*. Beverly Hills, CA: Sage.

This collection of essays touches on ethnographically oriented evaluation of educational programs. Health educators wishing to learn about this recently emphasized approach to educational evaluation will find this volume of interest.

21. Green, L.W. (1979). Research methods translatable to the practice setting: From rigor to reality and back. In S.J. Cohen (Ed.), *New directions in patient compliance* (pp.141-151). Lexington, MA: Lexington Books.

Green attends to a practical dilemma facing those who evaluate health education programs, namely, the necessity to make trade-offs between validity and feasibility in field settings. Six strategies for coping with evaluation under adverse circumstances are described.

22. Green, L.W., & Figa-Talamanca, I. (1974). Suggested designs for evaluation of patient education programs. *Health Education Monographs, 2* (1), 54-71.

In this essay Green and Figa-Talamanca suggest data-gathering designs for conducting evaluations of patient education programs. The authors also explore several issues related to evaluations of this variety.

23. Green, L.W., & Lewis, F.M. (1986). *Measurement and evaluation in health education and health promotion*. Palo Alto, CA: Mayfield.

This volume is an excellent resource for health educators concerned with the evaluation of their programs. Green and Lewis provide a series of useful explanations of topics in both measurement and health evaluation. Their expositions are peppered with practical examples drawn from health education and health promotion.

24. Hambleton, R.K., Swaminathan, H., Algina, J., & Coulson, D.B. (1978). Criterion-referenced testing and measurement: A review of technical issues and development. *Review of Educational Research, 48* (1), 1-48.

This is a comprehensive review of the field of criterion-referenced testing. Hambleton and his colleagues do a masterful job of isolating the key issues in criterion-referenced testing and describing results of research investigations bearing on those issues. Somewhat technical at times, this review is one of the more widely cited essays dealing with criterion-referenced testing.

25. Hays, W.L. (1973). *Statistics for the social sciences*. New York: Holt, Rinehart, and Winston.

This comprehensive text handles basic and advanced statistical considerations. Somewhat technical at points, Hays nonetheless provides an excellent set of step-by-step guidelines to statistical practice.

26. Joint Committee on Standards for Educational Evaluation. (1981). *Standards for evaluations of educational programs, projects, and materials.* New York: McGraw-Hill.

The development of these evaluation standards was spearheaded by a joint committee of the American Educational Research Association, the American Psychological Association, and the National Council on Measurement in Education. Thirty standards are presented, addressing issues related to deciding whether to evaluate, defining the evaluation problem, designing the evaluation, budgeting for the evaluation, collecting and analyzing data, and reporting the evaluation. Intended for both consumers of evaluation and individuals conducting evaluations, this reference may be of most use to evaluators who are relatively new to the field.

27. Kubiszyn, T., & Borich, G. (1987). *Educational testing and measurement: Classroom application and practice* (2nd ed.). Glenview, IL: Scott-Foresman.

Another introductory text dealing with the nuts and bolts of measurement, this book will provide health educators with a good overview of educational measurement.

28. Levin, H.M. (1975). Cost-effectiveness analysis in evaluation research. In M. Guttentag & E.L. Struening (Eds.), *Handbook of evaluation research* (Vol. 2, pp. 89-122). Beverly Hills, CA: Sage.

This essay probes the important considerations involved in determining cost-effectiveness of programs in the context of educational evaluations. Theoretical as well as practical guidelines are provided.

29. Levin, H.M. (1983). *Cost-effectiveness: A primer* (New Perspectives in Evaluation, Vol. 4). Beverly Hills, CA: Sage.

This text is a splendid introduction to the fundamental concepts of cost analysis on program evaluation. Levin provides succinct descriptions along with advantages and disadvantages for cost-feasibility, cost-effectiveness, cost-benefit, and cost-utility analyses.

30. Linn, R.L., & Slinde, J.A. (1977). The determination of the significance of change between pre- and posttesting periods. *Review of Educational Research, 47,* 121-150.

This article reviews many of the major issues in the measurement of change from pretesting to posttesting periods and suggests possible alternatives. These authors share the general sentiment of many others in the field that "more is expected from gain scores than they can reasonably be expected to provide."

31. Lord, F.H. (1963). Elementary models for measuring change. In C.W. Harris (Ed.), *Problems in measuring change* (pp. 21-38). Madison: Wisconsin Press.

This is an early treatise on the problems associated with measuring change. Although this chapter rapidly becomes very technical, the early sections provide an intuitive explanation of the difficulties with using gain scores.

32. Mark, M.M., & Shotland, R.L. (Eds.). (1987, Fall). *Multiple methods in program evaluation* (New Directions for Program Evaluation, No. 35). San Francisco: Jossey-Bass.

Decrying the infrequency with which multiple methods are used in program evaluation, six chapters are offered in this volume, not only advocating multiple methods, but also describing how such program evaluations can be conducted.

33. Oakland, T. (Ed.). (1977). *Psychological and educational assessment of minority children.* New York: Brunner/Mazel.

This collection of essays provides a series of useful suggestions for those who are more sensitive to the possible bias present in educational tests.

34. Popham, W.J. (1981). *Modern educational measurement.* Englewood Cliffs, NJ: Prentice-Hall.

Varied topics in the field of educational measurement are introduced in this text. Norm-referenced measurement and criterion-referenced measurement are both considered, with the special applications of criterion-referenced assessment emphasized. Chapters on the relationship of testing to teaching and the measurement of affect will be of special interest to health educators.

35. Popham, W.J. (1988). *Educational evaluation.* Englewood Cliffs, NJ: Prentice-Hall.

This is an introductory text, written in fairly nontechnical language, about the field of educational evaluation. Evaluators of health education programs will find it simple to translate the book's contents to their own specialties.

36. Popham, W.J., & Sirotnik, K.A. (1973). *Educational statistics: Use and interpretation* (2nd ed.). New York: Harper and Row.

This easily read introductory text deals with the fundamental types of statistical considerations needed by program evaluators. It is intended for those who are not particularly comfortable with mathematical approaches to statistics.

37. Riecken, H.W., & Boruch, R.F. (1971). *Social experimentation: A method for planning and evaluating social intervention.* New York: Academic Press.

This is a significant contribution to our thinking about large-scale social interventions, their design and appraisal. It provides a useful analysis of the ways that the experimental method can be defensibly employed in connection with major social programs.

38. Rivlin, A.M., & Timpane, P.M. (Eds.). (1975). *Ethical and legal issues in social experimentation.* Washington, DC: Brookings Institution.

Rivlin and Timpane explore the sorts of legal and ethical issues to which evaluators of health education programs must attend.

39. *SPSS-X User's Guide* (3rd ed.). (1988). Chicago: SPSS Inc.

This is a widely used, well-organized set of "canned" computer analysis programs for use in the social sciences. Health educators who have occasion to use computer analyses will find the SPSS manual most helpful.

40. Salvia, J., & Ysseldyke, J.E. (1981). *Assessment in special and remedial education* (2nd ed.). Boston: Houghton Mifflin.

This text, intended for individuals who must apply assessment to special education and remedial education, provides measurement insights for health educators who deal with such populations of learners.

41. Scriven, M. (1967). The methodology of evaluation. In R.W. Tyler, R.M. Gagné, & M. Scriven (Eds.). *Perspectives of curriculum evaluation* (pp. 39-83). Chicago: Rand McNally.

This seminal article was the first essay in which Scriven distinguished between the now commonly accepted formative and summative roles of evaluators. Scriven addresses a wide variety of topics, emphasizing the importance of comparative appraisals of two or more programs' merits.

42. Scriven, M. (1972). Prose and cons about goal-free evaluation. *Evaluation Comment, 3*, 1-4.

In this essay Scriven offers goal-free evaluation as an antidote to excessive preoccupation with the program staff's expressed objectives. Scriven argues that evaluators should attend to the results produced by a program, not the rhetoric of its program goals.

43. Siegel, S. (1956). *Nonparametric statistics for the behavioral sciences.* New York: McGraw-Hill.

This is the classic treatment of nonparametric statistical techniques. Although a bit out of date these days, Siegel's text offers the most easily understood treatment of nonparametric statistical procedures. Because of the author's admitted zealousness in support of nonparametric techniques, those using Siegel's text should also consult a critique of it by Robert Savage, *Journal of American Statistical Association*, 1957, *52*, 331-344.

44. Suchman, E.A. (1967). *Evaluative research: Principles and practice in public service and social action programs.* New York: Russell Sage Foundation.

In this volume, Suchman provides extensive coverage of the application of the experimental research model in conducting evaluations. Although evaluation has come a long way since this book was written, the volume provides a clear description of the predominant conceptualization of evaluation in the past decade.

45. Tukey, J.W. (1977). *Exploratory data analyses.* Reading, MA: Addison-Wesley.

Creative approaches to displaying and understanding data are provided by Tukey in this excellent demystification of data analysis.

46. Walberg, H.J., Postlethwaite, T.N., Creemers, B.P.M., & de Court, E. (Eds.). (1987). Educational evaluation: The state of the field. *International Journal of Educational Research, 11* (1).

This special issue, as its title suggests, presents comprehensive review of field of program evaluation from authors based in the U.S. and abroad.

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47. Webb, E.J., Campbell, D.T., Schwartz, R.D., Sechrest, L., & Grove, J.B. (1981). *Nonreactive measures in the social sciences* (2nd ed.). Dallas: Houghton Mifflin.

This charming volume provides readers with a series of powerful and clever tactics to secure data, particularly of an affective nature, without sensitizing respondents to the evaluator's purposes.

48. Weiss, C.H. (1972). *Evaluation research: Methods of assessing program effectiveness.* Englewood Cliffs, NJ: Prentice-Hall.

Weiss offers a pithy overview of prominent program evaluation considerations including the formulation of questions to be addressed, the design of the evaluation study, and the utilization of evaluation results. A paperback, this brief book (160 pp.) offers an excellent introduction to what Weiss refers to as "evaluation research."

49. Windsor, R.A., Baranowski, T., Clark, N., & Cutter, G. (1984). *Evaluation of health promotion and education programs.* Palo Alto, CA: Mayfield.

This text is a useful introduction to the evaluation of health education programs. Windsor et al. have provided readers with a series of health-relevant examples to illustrate their explorations.

50. Worthen, B.R., & Sanders, J.R. (Eds.). (1973). *Educational evaluation: Theory and practice.* Worthington, OH: C.A. Jones.

This volume was one of the earliest compilations of various program evaluation models applied to education. Evaluation theorists whose views are presented in this book include Stake, Cronbach, Scriven, Tyler and others. Worthen and Sanders have authored sections of the book and have included a series of original chapters by a number of evaluation specialists. While focused on educational evaluation in general, the volume is of substantial relevance to program evaluation of health education programs.

51. Worthen, B.R., & Sanders, J.R. (1987). *Educational evaluation: Alternative approaches and practical guidelines.* New York: Longman.

This introductory text is organized around a series of alternative approaches to educational evaluation, including the "objectives-oriented" and "advisory-oriented" approaches.

52. Worthen, B.R., & White, K.R. (1987). *Evaluating educational and social programs: Guidelines for proposal review, onsite evaluation, evaluation contracts, and technical assistance.* Boston: Kluwer-Nijhoff.

This volume provides a first-rate series of practical guidelines dealing with varied aspects of proposal review, onsite evaluation, evaluation contracts, and technical assistance.

53. Zdep, S.M., & Rhodes, I.N. (1977). Making the randomized response technique work. *The Public Opinion Quarterly, 40,* 531-537.

This easily read essay describes the randomized response technique, a procedure used to obtain sensitive information from respondents more accurately than if respondents were directly asked about sensitive information.